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No. XI. OF VOL. I., 1926. LONDON, SATURDAY, MARCH 13, 1926. Pp. 128—Price 1s.
No. 5350. Vol. CCX. Founded 1823. Registered as a Newspaper. Published Weekly. Annual Subscription Inland £2 2s. Abroad £2 10s.



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# Milroy Lecture

ON

# EXPERIMENTAL EPIDEMIOLOGY.

*Delivered before the Royal College of Physicians of London on March 4th*

BY W. W. C. TOPLEY, M.D. CAMB., F.R.C.P. LOND.,

PROFESSOR OF BACTERIOLOGY, UNIVERSITY OF MANCHESTER.

IN the preceding lecture a brief description was given of the general character of experimental epidemics among mice, and of the effect of adding susceptible to infected animals in various ways and at different rates. In the present lecture I propose to discuss such data as are available with regard to the factors concerned in bringing about the phenomena observed.

There are two principal participants in the struggle which underlies any epidemic of infective disease, the specific parasite and the animal host. It is convenient, for the purposes of discussion, to consider separately the factors which may vary in connexion with each of these, though this separation is extremely difficult to make in practice, and this difficulty forms one of the chief obstacles to a better understanding of the actual course of events.

The important variables in the case of the parasite may be supposed to be concerned with dosage and with pathogenic power; but it is far from easy to define either of these factors as they are concerned in the natural spread of disease from host to host, and still less easy to give them quantitative expression. It is my personal belief that the facile, but uncritical, use of such terms as dosage and virulence has done much to confuse the issues.

## DOSAGE.

It is usual to apply the term "dose" to the number of viable bacteria received by an animal host during an interval of time so short that the reception may be regarded as a single event; but very little consideration will show that such a definition cannot be employed in describing the course of events during the natural spread of disease among an infected herd. Dosage, in this sense, cannot be expressed as a quantity of bacteria, for we are not concerned with an isolated event, the reception of so many bacteria by a particular mouse. It can only be expressed as a probability, the chance that any one individual among the population at risk will, within a given time, receive a given number of bacteria.

Since we are concerned not with a single event occurring in a small interval of time, but with a possible succession of events covering weeks, months, or years, we must consider the possible effects of the order of doses, as well as the total dosage received in any period of time; and there is every reason to believe that a small dose of the specific bacterium, followed after an appreciable interval by a large dose, may have a very different result from that produced by an initial large dose, whether followed or not by subsequent smaller doses. In this connexion we must also take into account the rate at which a series of doses are received, a question which has been discussed by Dudley,[53] in connexion with naturally occurring outbreaks of diphtheria. His views as to the part played by the velocity of infection raise issues of the greatest interest and importance.

We must also realise that the functional significance of dosage may differ widely when we are considering, on the one hand, the natural intake of bacteria as by ingestion or inhalation, and, on the other, the introduction of bacteria directly into the tissues by inoculation. Defence mechanisms come into play in the former case, which are circumvented in the latter. It is probable that, in naturally occurring infection, many interrelated factors are concerned, and that these may vary independently; so that the actual event, in any particular case, will be largely a matter of chance, unless the dose received be so large as to overwhelm all possible resistance, or so small as to be inoperative under any circumstances. It may be that repeated small doses, within certain limits, will be more effective than a single larger dose, since there will be a succession of trials, each of which may succeed or fail. If, however, these trials are not independent, but the chance of success or failure of any one of them is determined to some extent by the results of previous trials (and this is almost certainly the case), then the problem becomes exceedingly complex, and the definition or measurement of effective dosage can hardly be achieved.

In the present state of our knowledge we can only speak of dosage, as it affects the events within an infected herd, in the most general way, remembering that it must in any case imply a chance of something happening, and not the quantitative expression of an actual isolated event.

## VIRULENCE.

Another variable in relation to the parasite is its power of establishing itself in the body of an animal host, and of producing disease and death when so established. This power is often referred to as virulence, but, as I have emphasised elsewhere,[6] this term as at present used is inadequate and misleading. There are at least two factors involved: the ability to proliferate at the point of entry, for instance, in the naso-pharynx or in the intestinal tract of the host, and the ability either to produce some toxin at the site of local proliferation or to invade the tissues and produce sickness or death by a generalised infection. We have no right to assume, a priori, that these biological properties are always highly correlated, that an organism which is capable, once it has gained access to the tissues, of causing a rapidly fatal septicæmia or toxæmia is also endowed with those properties which will enable it to spread readily from host to host among an infected herd. It is important, therefore, when we attempt to measure any biological character of the parasite with the object of defining the rôle of this factor in the epidemic spread of infection, that we should first determine as precisely as possible what it is that we are measuring. The term "virulence" is so firmly established in the medical vocabulary that it seems hopeless to replace it; moreover, if used in its literal sense of poisonousness, without any implication as to the particular lethal mechanism involved, it serves a useful purpose. It will be used here in this general sense, implying simply the power to produce death of a particular species of animal within a specified time-limit.

## HERD-RESISTANCE.

When we turn to the variable factors in connexion with the host, it is usual and convenient to group together all those characters which play a part in determining the occurrence, course, and outcome of a microbial infection, once the parasite has gained access to the body, under the general terms "resistance" or "immunity." At the moment we must be content with some such vague description of the sum-total of the host's defensive powers, but there is one point which needs immediate emphasis.

Most of us who have been concerned at all with the problem of immunity have been accustomed to take the individual as our unit. When we take as our unit not the individual but the herd, entirely new factors are introduced. Herd-resistance must be studied as a problem sui generis. One factor peculiar to the development of communal as opposed to individual immunity may be referred to here. A herd may clearly increase its average resistance by a process of simple selection, by the elimination through death of its more susceptible members. The initial distribution of resistance among the population

* The first lecture appeared in THE LANCET last week.

at risk will almost certainly be uneven, and it will probably vary with time, since there is no reason to suppose that the resistance of any individual host will remain constant throughout the course of an epidemic. That some process of active immunisation will be associated with the occurrence of non-fatal infection may safely be assumed, though its degree and importance may be very difficult to assess, so that we must allow for the possibility that the spread of infection which is killing some of our hosts is immunising others. Here, again, just as the factor of dosage, as it intervenes in the phenomenon of herd infection, can only be expressed in terms of probability, depending upon the distribution of the parasite, so the resistance of the herd at any given moment will be determined by the frequency distribution within it of individuals of varying orders of susceptibility.

A very imperfect analogy may help to depict the position. Suppose we take a number of stakes of different thickness, plant them in the ground and expose them to bombardment with stones of varying size flung from catapults of varying strengths. After a certain time we shall find that a number of the stakes have been broken. This will not have happened to many of the thicker stakes, but other survivors will consist of thinner stakes, around which ineffective missiles have formed a protective armour. Survivors of the latter class are in a precarious state; subsequent bombardment may displace the protective heap, and perhaps add its impetus to that of the new missile. Survivors of the former class may eventually be destroyed by missiles of sufficient momentum. At any given moment many of the stakes still standing will owe their survival to chance escape from fatal impacts. On the whole the fact that, in our experimental work, we have nearly always found that the oldest survivors of series of epidemics ultimately died of the specific infection is in favour of the view that the way the shots fall, rather than the thickness of the stake, is the important factor; but since our only criterion of relative thickness is, in practice, whether the stake falls or not, judgment remains difficult.

### OTHER FACTORS.

It should be emphasised here that there is no justification for assuming that the quantitative and qualitative relations between the parasites and hosts are the sole determinants of the epidemic spread of infection. There are excellent reasons for believing that other factors may play a decisive rôle. It is, of course, the main object of such experiments as those we have carried out to reduce the number of such extraneous factors to a minimum; but there is a limit beyond which conditions cannot be simplified, and it may well be that some of the extraneous factors which have not been eliminated may play an essential part in the phenomena observed. It is, for instance, very possible that other micro-organisms, in addition to the specific parasite of the disease under investigation, may exert an important influence on the course of events. It is certain that innumerable bacteria and other organisms must pass to and fro from host to host under the conditions existing in these experiments, and we know of many examples in human and animal diseases in which double infections appear to play a decisive rôle. Other factors, such as variations in diet when these occur, or the ingestion or inhalation of particular toxic substances, may clearly be involved, and the possible part played by insect vectors of infection may have to be taken into account in particular instances.

In the light of these general considerations, we may briefly consider the data which have been yielded by experiment.

### EXPERIMENTS ON DOSAGE.

As a preliminary to studying the influence of dosage in the natural spread of bacterial infection, it is necessary to obtain some idea as to the effect of variations in the number of bacteria received by the host in the experimental infection of individual mice. It is frequently assumed that the relation between dosage and death in such experimental infections is a very simple and direct one, so that it is an easy matter to determine the minimal lethal dose of any pathogenic organism and to compare the virulence of two cultures of a given organism by determining the minimal lethal dose of each of them. It may, however, be noted that such measurements have generally been made on organisms which produce a distinctive toxin or bring about a lethal result by causing a rapidly fatal septicæmia, and which in either case are not natural pathogens of the experimental animal employed.

It is rash to assume that the same relations will hold true in the case of bacteria which naturally attack the host species chosen for experiment, and are known to give rise to acute or chronic disease or to a condition of latent infection. Lockhart, working in my laboratory, has recently made a careful study of the effect of variation in dosage on *B. aertrycke* infection in mice. His complete report is about to be published elsewhere,† but I am permitted to refer to some of his results.

His own experiments were in all cases concerned with the results of intraperitoneal inoculation, but he collected from the literature a large number of experiments in which this organism had been administered either intraperitoneally or per os, including a very large number recorded by Webster, a smaller number by myself and my colleagues, and a few reported by Neufeld, Lange, and others. To these were added the results recorded in many unpublished experiments carried out in my own laboratory. The relevant figures are recorded in Table III. It is

TABLE III.

| Dose. | Per os (collected). | | Intraperitoneal (collected). | | Lockhart. | |
|---|---|---|---|---|---|---|
| | No. of mice. | % mortality. | No. of mice. | % mortality. | No. of mice. | % mortality. |
| $10^8$ | 198 | 41·4 | — | — | — | — |
| $10^7$ | 111 | 63·0 | 154 | 100 | 400 | 90·75 |
| $10^6$ | 111 | 42·0 | 149 | 98 | — | — |
| $10^5$ | 36 | 22·2 | 211 | 95·7 | 400 | 70·0 |
| $10^4$ | 43 | 23·5 | 125 | 76·5 | — | — |
| $10^3$ | — | — | 59 | 86·6 | 400 | 59·75 |
| $10^2$ | — | — | 43 | 46·4 | — | — |
| 10 | — | — | — | — | 400 | 30·75 |

obvious that large fluctuations in dosage, over a wide range, may make relatively little difference in the resulting percentage mortality. If we consider dosage in the wider sense, which has been outlined above, it is far more difficult to obtain any reliable data. Amoss,[21] in the communication to which we have already referred, lays considerable stress on the influence of dosage in the epidemic spread of mouse-typhoid, and regards variations in this factor, together with variations in the biological properties of the parasites, as probably determining the course of events. An increase in dosage is assumed to be an inevitable result of the contraction of the specific disease by the more susceptible mice, and this assumption is a very natural one, if we use the term "increase in dose" to mean an increased chance of any mouse at risk ingesting the specific bacterium. No attempt, however, is made to measure this increase in the concentration of *B. aertrycke* in the cage.

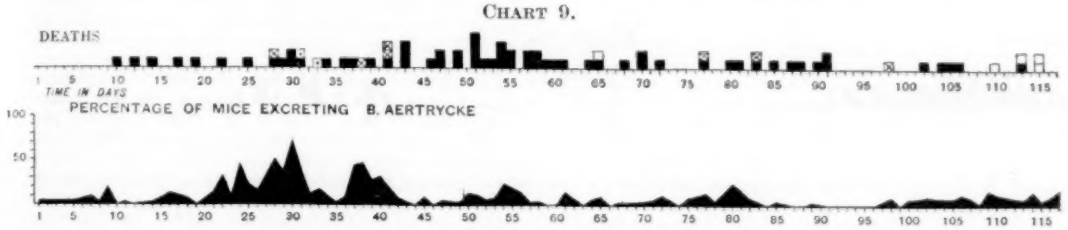
In one of our own experiments[13] we have carefully followed the daily excretion of *B. aertrycke* by each mouse in a herd among which mouse-typhoid was spreading, and to which one normal mouse was added daily. The technique employed gave roughly quantitative results, so that we were able to estimate the copiousness of the excretion in each case as well as its actual occurrence. Chart 9 records the more important data obtained. On the upper base line are recorded the daily deaths in the same manner as in the earlier charts. Below is recorded, for six days out of every seven, the percentage of the mice at risk which were excreting *B. aertrycke* in their fæces. It will be seen that the main wave of mortality is preceded,

† Jour. of Hygiene, xxv., 50.

at a considerable interval, by a marked rise in the excretion-rate, and that this excretion-rate falls while the epidemic is gaining force. It is clear from this experiment that, so far as mouse-typhoid is concerned, there is, during the pre-epidemic phase, an increasing probability that any given mouse will, within any assigned interval of time, ingest a certain number of *B. aertrycke*.

With regard to pasteurellosis, we have at present far less information as to the relation between dosage and death in the individual mouse, and none at all as to the carrier-rate in an infected herd. Such data as we do possess on the former point suggest that, here again, variation over a wide range in the number of bacteria received by an individual host as a single dose has relatively little effect in determining the outcome of the resulting infection.

CHART 9.




### EXPERIMENTAL STUDY OF VIRULENCE.

In an extensive series of experiments, in which mice were infected with *B. aertrycke* either by intraperitoneal inoculation or by injection into the stomach through a metal catheter, Webster [26-30] obtained results which led him to the view that variations in the virulence of the bacterial parasite played little, if any, part in the epidemic spread of mouse-typhoid. He concluded from his results that any one strain of *B. aertrycke* retains its virulence at a constant level over long periods of time, when subcultured on the ordinary laboratory media, and that no evidence could be obtained of any significant increase in virulence when a given strain was passed from mouse to mouse.

The investigation carried out by Lockhart, to which I have already referred, has indicated very clearly the difficulties to be faced in comparing the virulence for mice of two or more strains of *B. aertrycke*. Paying due attention to the probable errors of sampling, Lockhart found that strains of *B. aertrycke* might show a marked decrease in virulence, as judged by intraperitoneal inoculation, after repeated subculture in broth; that different strains, with a common derivation within a period of a few years, but isolated from different mice and under different circumstances, might show significant differences in virulence; and that mouse-to-mouse passage might produce a significant increase in the virulence of a given strain, although such an increase could not be produced with any constancy. For the details of Lockhart's experiments reference must be made to his report, now in course of publication.

TABLE IV.

| Strain of *B. aertrycke*. | No. of mice fed. | Total deaths. | Specific deaths. | Total No. infected.* | Strain of *B. aertrycke*. | No. of mice fed. | Total deaths. | Specific deaths. | Total No. infected.* |
|---|---|---|---|---|---|---|---|---|---|
| Pl.19.v. | 20 | 11 | 11 | 13 | A 52 | 20 | 1 | 1 | 6 |
| | 20 | 15 | 14 | 15 | | 20 | 1 | 0 | 7 |
| | 20 | 15 | 13 | 13 | | 20 | 2 | 0 | 5 |

* This includes surviving mice from whose spleens *B. aertrycke* was isolated post mortem.

In Table IV. are set out the results of testing two of our own strains of *B. aertrycke* by administration o mice per os. Suspensions of growths on agar were made in Ringer's solution and administered by allowing a few drops of a suitable dilution to fall into the open mouth of each mouse from a calibrated dropping pipette. Each strain was tested on three separate batches of mice, each batch consisting of 20 animals, in order to determine the deviation in the percentage mortality due to chance variation. The mice were observed over a period of 28 days, and the survivors were then killed and cultures made from their spleens.

It is obvious from the table that strain Pl.19.v. is more virulent than strain A 52, since the difference in the mean percentage mortality in the two groups is well beyond the probable error of sampling indicated by the deviation within each group. It is obvious also that the strain which is more virulent produces a higher percentage of total infections, lethal and non-lethal combined, but that this difference is not so great as the difference in percentage mortality. The fact that strains, which are relatively avirulent, may still produce a high proportion of non-lethal infections, has been clearly indicated in Lockhart's experiments.

It should perhaps be emphasised that the variations in the power of producing death, to which we are now referring, have not been related to any observable variations in colony formation, or in the mode of growth in liquid media. That rough variants of *B. aertrycke* occur has been demonstrated in the course of earlier experiments. The strains examined by Lockhart and by ourselves in the present series were all of the smooth variety.

Our results have therefore led us to a conclusion different from that reached by Webster. They indicate that significant variations in the virulence of *B. aertrycke* for mice may occur under various conditions. Whether or not such variations play any rôle in the epidemic spread of mouse-typhoid is a question which still awaits an answer.

With regard to variations in the virulence of *Pasteurella muris*, far less evidence is available than in the case of *B. aertrycke*; but the few experiments which we have performed leave little doubt that such variations occur. There is here no conflict of evidence between the results which we have obtained in mice and those which Webster [40-44] has obtained with pasteurellar infection in the rabbit. Here, again, the significance of such variation in the epidemic spread of the infection remains undetermined.

It has been emphasised above that biological characters of the parasite, other than virulence as here defined, may play an important part in the epidemic spread of infection. We have as yet no means of measuring such characters, so that we cannot detect variations if such occur.

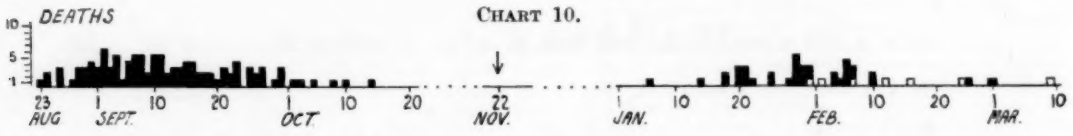
### EXPERIMENTAL STUDY OF HERD-RESISTANCE.

In considering the part played by the relative resistance of the animal hosts, we may first inquire whether there is any evidence that the mice, which have survived exposure to risk during the course of an experimental epidemic, show a greater average resistance to infection with the causative organism than that possessed by a similar sample of normal mice.

The first experiments bearing upon this question were concerned with the spread of mouse-typhoid. They were carried out by initiating an epidemic of

this disease among a herd of mice, allowing the epidemic to subside, waiting for a further six weeks, and then adding normal mice to the survivors in the proportion of 4 to 1. The course of events was then observed for a further three and a half months, and the deaths among the survivors and added mice were recorded. One such experiment is recorded in Chart 10. The initial epidemic and the secondary wave of mortality, which occurred some weeks after the addition of the normal mice, are fully recorded.

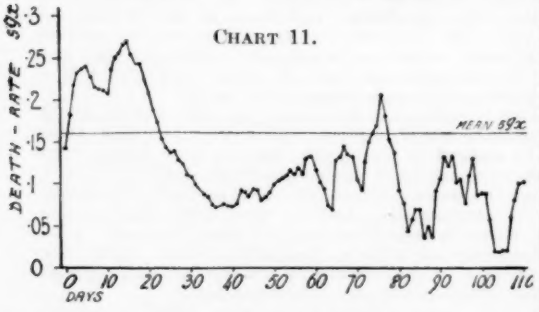
CHART 10.




The record is broken during the quiet interval to economise space. Each black square corresponds to the death of an added mouse. Each white square corresponds to the death of a survivor from the original epidemic. It is clear that, in the secondary wave of mortality, the newcomers were first affected. It was only towards the end of this secondary epidemic that the survivors from the original outbreak succumbed to the disease. When the experiment was discontinued 39 out of 44 newcomers had died, a mortality of 88·6 per cent. Among the survivors the deaths numbered 7 out of 11 mice, or 63·6 per cent. It is, however, the time-to-death rather than the total mortality which must be regarded as significant, since the numbers exposed to risk were small. The deaths of several survivors during the later stages of the secondary epidemic suggest that the relative resistance possessed by these animals, which enabled them to withstand the earlier stages of the secondary spread of infection, was insufficient to ensure their survival over a more prolonged period.

These observations were closely paralleled by the observations of Amoss,[21] to which reference has already been made. In the experiments in which he added normal mice to a population infected with mouse-typhoid he found that the death-rate among the added mice was always greater than among the survivors from the earlier periods. The occurrence of numerous deaths among these surviving mice, after long periods of exposure, showed that their increased resistance did not ensure them against a fatal attack of mouse-typhoid during the later stages of the epidemic.

CHART 11.




With regard to pasteurellosis, the available data give a clear answer to the main question at issue. In the experiments which Dr. Greenwood and I have carried out on this disease the death-rates after varying periods of exposure to risk have been calculated for each epidemic. Chart 11 shows the fluctuation in the death-rate, calculated as the probability of dying from pasteurellosis within the next five days, for all mice in the experiment in which three normal mice were added to the cage each day. The horizontal line indicates the mean value of this death-rate. It will be seen that the probability of dying within the next five days at first rises steeply, reaching a first maximum on the fifth day, and a second and higher maximum on the fifteenth day. It then falls steeply, and from about the thirtieth day onwards the death-rate runs a general course well below its mean value for the whole experiment. There are, however, marked fluctuations. The death-rate rises and falls steeply, but never approaches the level attained on the fifteenth day, and only once exceeds the mean value during the period covered by the chart. It is clear that if a mouse survives exposure to risk for the first 30 days its chance of dying within a short interval of time has markedly decreased, or conversely its expectation of life has improved. This must mean that its resistance to the average force of mortality existing in the cage is greater than the average resistance of more recently added animals. Whether the later fluctuations are significant, and their meaning if significance be established, are questions which cannot yet be answered. The relatively small numbers at risk during the later periods of exposure do not allow us to lay much stress on these movements, but they indicate that, as in the case of mouse-typhoid, prolonged exposure to risk is no insurance against a fatal attack of pasteurellosis.

These results prove that the *average* resistance of the survivors of a herd which has been submitted to the action of an epidemic of mouse-typhoid or of pasteurellosis is raised as the result of the experience through which they have passed. Is there any evidence that the resistance of each or any of the surviving individuals has also been raised? In other words, has the herd-immunisation resulted purely from selection, from the elimination by death of its more susceptible members, or have some proportion of the individuals of which the herd is composed passed through an immunising process? It is natural to suggest that the two processes are probably combined, that some form of non-fatal infection leading to increased resistance is involved, and that such sub-acute or latent infection is more likely to be established in those mice which are endowed from the outset with a relatively high grade of resistance. Such a priori assumptions, however, can serve only as working hypotheses, and it is in any case necessary to separate these two factors as clearly as possible and to assess their relative importance.

The obvious starting point of our inquiry is to determine the normal variation among mice of resistance to infection with the causative organism concerned, but this is no easy matter. In the case of *B. aertrycke* infection, the large series of experiments carried out by Webster afford a mass of carefully collected evidence which is seldom available in investigations of this kind. Proceeding by the method of intrastomachal inoculation, Webster[26-39] has infected very large numbers of mice with a constant dose of *B. aertrycke* and has observed the subsequent course of mortality. In this way he has been able to construct a curve showing the daily progress of mortality among the infected animals and the percentage of survivors at the end of the period of observation, which has usually extended over 60 days.

As the result of testing numerous samples of normal mice, each containing between 20 and 50 animals, he concludes that the time distribution of deaths and the final percentage of survivors are constant within narrow limits for any one strain of inbred mice. From a careful survey of the records contained in Webster's reports, and from the results obtained by Lockhart, it appears to us that the actual deviations encountered are quite considerable. In constructing this curve, which he refers to as the "standard curve" for any

strain of mice, Webster has plotted percentage mortality against time. It is clear that the figures could be plotted as a frequency curve showing the proportion of the total deaths occurring on each day. As we shall see, Webster makes use of such a curve in discussing the significance of his results.

It is clear that Webster's results present a record of the variations in the number and time distribution of deaths among normal mice, following the particular method of infection employed, which is of the greatest value when we wish to compare the fate of two samples of mice under different experimental conditions. Whether this is necessarily a record of the normal variation in *innate* resistance within the sample is, perhaps, not quite so certain. It may well be so, and such an assumption seems very natural, but it is necessary to inquire whether these differences may not be due in part to chance factors or to some transient physiological condition, so that a mouse which showed more than average resistance when tested at one time might show less than average resistance if tested at another. It is, for instance, not unlikely that the result of inoculating a bacterial suspension directly into the stomach may be determined in part by the physiological condition of that viscus at the moment when the suspension is introduced. It is quite probable that the outcome of an intraperitoneal inoculation may be influenced by the temporary position of the omentum or by the subsequent movements of this structure, which appear themselves to be governed by the movements of the abdominal wall and of the intestines. More general factors, such as fatigue or the existence of some unrelated infection, may account for a temporary variation in the normal resistance towards the particular parasite injected.

We cannot solve this question by direct experiment, because the successive trials would not be independent. It is evident that any mouse which had survived a single infection with a particular bacterium might, as a result of that experience, possess an altered resistance to subsequent inoculation of the same organism. It is clear, however, that if simple selection is to be effective in increasing the average resistance of a herd, the mice which have survived any given exposure to risk must have done so in virtue of lasting characters, which will enable them to withstand further exposure, and not because of some transient condition or chance event which will leave them, on the average, as susceptible as their fellows.

Webster has sought evidence of the existence of an innate and heritable resistance to enteric infection along other lines. He has carried out experiments in selective breeding [33 36] from the results of which he concludes that it is possible, in this way, to obtain strains of mice more resistant or more susceptible than unselected animals from the parent stock. For details of these experiments reference must be made to his reports, but the results recorded do not appear to us to form an adequate basis for any final conclusion, partly because the samples tested in each generation were very small, and still more because there is no evidence that the increase in resistance or in susceptibility becomes progressively more marked in successive selected generations.

Webster and Pritchett,[38 39] as the result of a large series of experiments, have arrived at the conclusion that strains of inbred mice show marked differences in their resistance to mouse-typhoid. Lockhart, who has recently analysed these results, has pointed out that the differences between the mean percentage mortalities, observed in the different strains of mice, approximate so closely to the standard deviations of the percentage mortalities observed in different samples of the same strain, that the results cannot be regarded as certainly significant.

We are left, then, with our main question unanswered, in the sense that it has not, at least in our view, been clearly demonstrated that there is an innate variation in the natural resistance of mice to a particular bacterial infection of such a nature and degree that a selective increase in the average resistance of the herd would inevitably result during the passage of a wave of mortality due to the bacterial parasite in question. We do not, of course, suggest that there is any evidence against the existence of such innate differences in resistance; indeed, we should be surprised if further investigation showed the part played by this factor to be negligible or unimportant. The recent experiments of Hirszfeld [55] on the inheritance of immunity, or immunisability, to diphtheria offer suggestive analogies. For the moment the only possible verdict appears to us to be "non-proven."

Turning to the alternative hypothesis, the active immunisation of individual mice during the progress of an epidemic, with a resulting increase in the average resistance of the herd of which they form a part, the available data allow us to arrive at a rather more definite conclusion, at least, in the particular case of mouse-typhoid. Numerous experiments have been performed on the immunisation of mice by the administration of dead or living cultures of *B. aertrycke* by Webster, Neufeld, Lange and Yoshioka, ourselves, and others. Webster's series of experiments have been particularly thorough and extensive. The available data on this question have recently been summarised by Neufeld,[46] and by Topley and Wilson.[14]

We are not for the moment concerned with the effect of the administration of dead organisms. Confining our attention to the results of administering living cultures by various routes, we find that there is ample evidence that mice which have been so treated, and which have survived the treatment, are more resistant to subsequent infection than are normal controls. But, here again, we cannot altogether escape the horns of our dilemma. Are these treated and surviving mice more resistant than the controls because they have been immunised, or because their originally high resistance has enabled them to withstand the original infection? The data available do not allow us to come to a conclusion on this point which is statistically unassailable, but a careful survey of the protocols of the experiments referred to strongly suggests that some part at least of the increased resistance is due to active immunisation. In some experiments, for instance, the surviving mice have withstood a dose of *B. aertrycke* which has sufficed to kill all the inoculated controls, so that it is difficult to ascribe their increased resistance to selection alone. An even more important consideration, in our view, is the fact that it has been clearly demonstrated that the animals which have survived experimental inoculation have not, for the most part, escaped infection but have resisted it, and are in fact harbouring the causative organism in their tissues. It appears to us highly improbable that the existence of such a latent infection should be without influence on the results which follow the subsequent reception by these mice of further doses of the same bacterium. In this connexion we would call particular attention to the experiments which have been carried out by Morgenroth [51] and his colleagues on superinfection. In a considerable series of experiments, in which mice were infected with sub-lethal doses of particular bacteria and were subsequently reinoculated with the same, or with closely allied organisms, these workers were able to demonstrate a significant increase in average resistance among the chronically infected mice. It seems possible that we shall gain valuable information with regard to the mechanism of active herd-immunisation by investigation along these lines.

If the increased resistance shown by the mice which have survived exposure to risk be due, in large part, to active immunisation resulting from a non-lethal infection, we should expect that they would show evidence of the infection through which they had passed, or which they were still supporting. Clearly the most satisfactory evidence of the existence of such an infection would be provided by the isolation of the causative organism from the tissues. In numerous experiments on mouse-typhoid the mice surviving at the termination of an epidemic have

been examined post mortem and cultures have been taken from their spleens. The results obtained are summarised in Table V., together with the results

TABLE V.—*Showing the Proportion of Positive Spleen Cultures among Various Groups of Surviving Mice.*

| Group. | Survivors left alive— | Number of mice in group. | Number of mice with positive spleen cultures. | Percentage of mice with positive spleen cultures. |
|---|---|---|---|---|
| 1 | After 11 epidemics of mouse-typhoid lasting from 60 to 117 days .. .. .. | 267 | 190 | 70 |
| 2 | 21 days after intraperitoneal or subcutaneous inoculation of *B. aertrycke* (moderate doses).. .. .. .. | 50 | 44 | 88 |
| 3 | 14 days after intraperitoneal inoculation of $10^7$ *B. aertrycke* | 40 | 40 | 100 |
| 4 | 14 days after intraperitoneal inoculation of $10^5$ *B. aertrycke* | 114 | 109 | 95·6 |
| 5 | 14 days after intraperitoneal inoculation of $10^3$ *B. aertrycke* | 280 | 232 | 82·9 |
| 6 | 14 days after intraperitoneal inoculation of 10 *B. aertrycke* | 213 | 95 | 44·6 |
| 7 | 42 days after one feeding with $20 \times 10^8$ *B. aertrycke*.. .. | 98 | 60 | 61·2 |
| 8 | 42 days after one feeding with $2 \times 10^8$ *B. aertrycke* .. .. | 39 | 13 | 33·3 |
| 9 | 42 days after three or four feedings with $2 \times 10^8$ *B. aertrycke* .. .. .. | 59 | 39 | 66·1 |

obtained in the case of individual mice which have been submitted to experimental infection. In the latter series are included the results recently obtained by Lockhart. The figures need little comment. It is clear that the majority of the mice which have recently passed through an epidemic of mouse-typhoid have not escaped infection, nor completely recovered from it, but are still harbouring the causative organism in their tissues. Their position in this respect is similar to that of mice which have survived for periods of two to six weeks after the experimental administration of *B. aertrycke* by inoculation or by the mouth. Other evidence, indicative of the wide incidence of infection among the mice at risk during the epidemic spread of this disease, has been afforded by the demonstration of agglutinins for *B. aertrycke* in the blood of surviving animals. Amoss found that 37 out of 56 mice which had survived a single epidemic wave possessed agglutinins for *B. aertrycke* in their blood.

Finally, we would draw attention to an experiment, already referred to, in which we obtained detailed records of the daily excretion of *B. aertrycke* in the fæces of all mice at risk during an epidemic which was maintained for a period of 117 days by the daily addition of one mouse to the cage. The total number of mice at risk during this period was 135, excluding 5 infected mice which were employed to initiate the epidemic. Of these, 55 were alive when the experiment terminated. Of the whole number at risk 122 yielded evidence of infection by dying of mouse-typhoid, by excreting *B. aertrycke*, by yielding a culture of this organism from the spleen when killed at the termination of the experiment, or by the presence of agglutinins in their blood. Only 13 mice failed to show any evidence of infection with *B. aertrycke* by any of the methods of examination applied. Of these, 6 mice had resided in the cage for less than 14 days when the experiment was terminated, while one mouse, whose sojourn in the cage was 27 days, was devoured by its companions and could not be examined post mortem. Thus among 121 mice‡ which had been exposed to the risk of infection for 14 days or more only 6 failed to yield evidence of a reaction to the presence of the parasite.

There would appear to be little doubt that during an experimental epidemic of mouse-typhoid the great majority of mice exposed to risk become infected within a short time of their entry to the cage, and that a high proportion of those mice which withstand such infection continue to harbour *B. aertrycke* in their tissues for a considerable period. Such survivors have been shown to possess an increased average resistance to the disease as naturally acquired. We are far from denying the existence and possible importance of simple selection based on innate differences in resistance, still further from neglecting the possibility that there may be natural variations in the capacity of mice to become actively immunised; but it seems to us that we are on surer ground in attributing some part, at least, of the relative immunity of the surviving animals to active immunisation.

‡ This figure was incorrectly given as 135 in a previous report.

### EXTRINSIC FACTORS.

We have suggested that variations in the infective power of the parasite, or in the resistance of the host, by no means exhaust the possible interplay of factors which determine the sequence of events in our herds of mice. We have as yet little information on such matters as the possible influence of microbial association, or of other factors which might result in a shifting equilibrium between parasite and host. In the case of mouse-typhoid we have carried out experiments on the possible rôle of the bacteriophage in the epidemic spread of this disease, but our results have been entirely negative.

Webster [34] has obtained evidence pointing to the importance of dietary factors in determining the incidence of infection with *B. aertrycke*. The interest and importance of such observations are obvious, but it seems unlikely that dietary factors can play any part in the fluctuating sequence of events which we have observed in our long-continued epidemics, since no change has been made in the nature and amount of the food-supply to the mice at risk.

On the basis of the evidence outlined above, we do not seem to be justified in going beyond the following conclusions.

In the case of mouse-typhoid, variations over a wide range in the size of a single dose of bacteria administered to mice by feeding, or by inoculation into the tissues, appears to have very little effect in determining the outcome of infection. There is a suggestion that the same holds true for mouse-pasteurellosis. It by no means follows that variations in the number of bacteria received by susceptible hosts during the natural spread of infection are unimportant. Under such circumstances, not only the size of individual doses, but the effect of a succession of doses, and the rate at which they are received, must be taken into consideration.

Variations in the virulence of *B. aertrycke* and of *Pasteurella muris* certainly occur. Whether such variations play any part in the natural spread of infection remains to be determined.

Mice which have survived exposure to risk during an epidemic of mouse-typhoid or of pasteurellosis show an increased average resistance to continued exposure to risk, as compared to normal mice which have not been so exposed.

When a sample of normal mice are tested by the inoculation of *B. aertrycke* into each mouse the response varies, and the variation may be studied by observing the time distribution of the deaths and the final percentage of survivors. It is not clear in how far this variable response depends on innate characters in the mice, on transient physiological conditions, or on the interaction of chance factors, so that we cannot be certain that the passage of a wave of mortality will leave survivors which were possessed, ab initio, of a high degree of resistance of a durable kind, and will so increase the average resistance of the herd by a process of simple selection. This problem still awaits solution.

In the case of mouse-typhoid there is ample evidence that the great majority of any given sample of surviving mice have not escaped infection, but have

resisted it. A high proportion of these mice are found to be supporting a latent infection with *B. aertrycke*. There is evidence that mice which have withstood individual experimental infection with *B. aertrycke* are far more resistant than normal mice to subsequent infection with this organism. It is, therefore, probable that active immunisation, following non-lethal infection, plays a considerable part in the increase of the average herd-resistance which follows exposure to an epidemic of enteric infection.

It is probable that additional factors not connected with dosage of the parasite, nor with variations in the biological characters of the parasites or hosts, play a part in the spread of epidemic infection. With the single exception that a bacteriophage, active against *B. aertrycke*, seems to have little influence on the course of events in epidemics of mouse-typhoid, we have as yet no information on this aspect of the problem.

When we attempt to give quantitative expression to any of the factors which are concerned in the spread of infection during an epidemic of disease, these factors must be measured not as absolute quantities, but in terms of probability. It seems certain that chance plays a large part in the sequence of events which we have observed and described, but this sequence is sufficiently orderly to suggest that an adequate knowledge of the various probabilities involved would allow us to give a generalised description of the interactions concerned.

*Bibliography.*—The bibliography to Lectures I., II., and III. appeared in THE LANCET of March 6th, p. 484.

# An Address

## ON THE TREATMENT OF MALIGNANT DISEASE WITH LEAD.*

*Delivered before the Glasgow Gynæcological and Obstetrical Society*

BY W. BLAIR BELL, B.S., M.D. LOND., HON. F.A.C.S.,

PROFESSOR OF GYNÆCOLOGY AND OBSTETRICS IN THE UNIVERSITY OF LIVERPOOL; GYNÆCOLOGICAL AND OBSTETRICAL SURGEON, ROYAL INFIRMARY, LIVERPOOL; HON. DIRECTOR, LIVERPOOL CANCER RESEARCH.

*In Association with*

H. F. WOOLFENDEN, M.D. Liverp., F.R.C.S. Eng.,
SURGEON TO THE ROYAL INFIRMARY;

W. R. WILLIAMS, M.D. Liverp., F.R.C.S. Eng. & Edin.,
ASSISTANT SURGEON, ROYAL SOUTHERN HOSPITAL;

L. CUNNINGHAM, M.B. Camb., M.R.C.P. Lond.,
ASSISTANT PHYSICIAN, DAVID LEWIS NORTHERN HOSPITAL;
AND

S. B. HERD, M.D. Liverp.,
ASSISTANT GYNÆCOLOGICAL SURGEON, ROYAL INFIRMARY.

*Together with a Comment by*

J. G. ADAMI, M.D. Camb., F.R.S.,
VICE-CHANCELLOR OF THE UNIVERSITY OF LIVERPOOL; FORMERLY PROFESSOR OF PATHOLOGY IN MCGILL UNIVERSITY, MONTREAL.

IN previous communications the scientific views on which this work is based have been fully explained and weighty confirmatory evidence—experimental and clinical—has been adduced in support of the statements made.[1 2 3 4 5 7] A paper concerning the toxic effects of lead administered intravenously has also been published.[6] We are now in a position, therefore, to discuss at some length our methods of procedure and our clinical results which, after all, are the ultimate test of all cancer research.

It must not be forgotten, however, that so far the treatment of our cases has been largely experimental and tentative in nature, and that, as might be expected, the results have been uneven and the failures and misfortunes many. *Indeed, we ourselves regard the results obtained in the treatment of the first 200 cases, mostly hopeless, merely as affording confirmatory support to the rest of the evidence pointing in the same direction, and not as being the outcome of a test of the merits of a new treatment.* Furthermore, we must insist that we make no claims whatsoever in regard to the general curability of cancer by the use of lead: we simply state the facts.

On Nov. 9th, 1920, the first intravenous administration of lead was given to a patient with an advanced breast carcinoma. Providentially this case proved one of the most interesting and striking of the whole series; and the importance of the result was none the less in that it gave us the stimulus and encouragement necessary in our dealings with the numerous dreadful cases of malignant disease that soon came under our care.

In passing we cannot refrain from saying that we know of no disease that produces so depressing an effect on those continually associated with it as cancer. The pitiable plight of the patients, the pain and discomforts that follow the involvement of important organs are such as to produce a profound impression on the mind of the patient, even though she may be unaware of the nature of the disease. Unfortunately, this is sometimes known, and when the patient has reached the depth of despair, it makes it difficult to persuade her that the faintest chance remains. Standing out against this in the brightest contrast we have seen wonderful heroism, even optimism, in some of those whose chance seemed slender. We feel that we must be allowed to say so much, because it may make clear to those, even to members of our own profession who appear not to have understood, how extremely reticent we have felt it necessary to be in order not to raise false hopes amongst the millions of sufferers with this disease who are scattered over the entire world.

As stated by one of us in the previous publication,[7] we believe that evidence has been obtained in many directions confirming the correctness of the lines on which we have worked and are still working. In these circumstances the moderate success we have obtained so far in the treatment of cancer may justify the guarded publicity we now give to our clinical work, even though it still appears an impossibility that cancer should be treated empirically with lead; we have already emphasised the dangers and difficulties of our methods.[6] In short, despite the pressure brought to bear, we do not think the time is yet ripe for the general employment of lead, for a vast amount of work, experimental and therapeutical, still remains to be accomplished. We have no doubt that the preparation of lead in colloidal form for intravenous injection will be vastly improved, or lead be administered in another form; and we recognise the possibility that some other substance may be found to act in the same way as lead on malignant neoplasms, but with less toxicity towards other tissues of the body.

### METHODS OF PROCEDURE.

*Records of the Patients.*

The work has been conducted on lines laid down at the commencement, special case-cards having been printed in order that a more or less uniform standard of detail should be obtainable. This

* This investigation was undertaken on behalf of the Liverpool Cancer Research Committee.

[1] Bell, W. Blair: THE LANCET, 1922, ii., 1005.
[2] Bell, W. Blair: Ibid., 1924, i., 267.
[3] Corran, J. W., and Lewis, W. C. McC.: Biochem. Jour., 1924, xviii., 6.
[4] Lewis, W. C. McC., and Corran, J. W.: Ibid., 1924, xviii., 6.
[5] Bell, W. Blair, Hendry, R. A., and Annett, H. E.: Jour. Obstet. and Gynæcol. Brit. Emp., 1925, xxxii., 1.
[6] Bell, W. Blair, Williams, W. R., and Cunningham, L.: THE LANCET, 1925, ii., 793.
[7] Bell, W. Blair: Ibid., 1925, ii., 1003.

we found of great value in summarising the toxic effects of lead.[6] On the case-cards all previous methods of treatment and the particulars of the present condition of the patient have been recorded, together with a full account of the examination of the body fluids and of any tissue removed for section. In addition, specially printed forms have been at the disposal of Prof. Ernest Glynn, who has reported on all the material submitted for histological examination. In many cases, sections sent with the patient have been re-examined and described in the light of subsequent events. Moreover, Dr. R. E. Roberts has examined radiologically a large number of the patients about whom it seemed likely that further information could be obtained by this method. Medical examinations, too, have been conducted in many cases by Prof. John Hay and Dr. L. Cunningham, and biochemical investigations by Dr. R. Coope and Dr. Cunningham. We have thus endeavoured to obtain all the evidence that would guide us in the subsequent treatment of our patients.

### *Indications for, and Contra-indications to, the Treatment of Patients with Lead.*

*Extent of the Malignant Growth.*—In regard to this question it may be said in general that a large amount of malignant tissue is not necessarily a bar to treatment, provided other conditions permit this course to be taken; but secondary involvements of the lung and the brain may be an absolute contra-indication. It will, moreover, be shown that serious accidents may occur when certain vital organs are affected, if the disappearance of the growth be too quickly accomplished.

*Condition of the Patient.*—The general condition of the patient must be viewed from several angles. First it is necessary to take into account the state of certain organs which, although unaffected by the malignant disease, may be subject to pathological lesions due to other causes, rendering treatment unduly dangerous; chronic nephritis is by far the most important of these lesions. Secondly, pressure on the common bile-duct by cancer of the head of the pancreas may produce a condition in the liver that makes it unwise to inject lead until the jaundice, mechanically produced in this way, has been relieved. Thirdly, we must take into consideration the constitutional state produced in the patient by long-standing malignant disease. As will be shown directly, many of our cases have died, some before treatment, others very shortly after the commencement, and, again, a number before lead in quantity considered sufficient to overtake the disease could be administered. At first we rejected no one—hence many unhappy incidents.

To-day we feel it is not right to prejudice any longer the method by dealing with totally hopeless cases—cases that after trial of every known form of treatment have been sent to us in the vain hope that the day of miracles is not past. At the same time it is not possible, nor humane, for us to adhere to any rigid line of demarcation. Yet, with our experience behind us, we have come to recognise those cases in which there is a prospect of relief; and by this we mean those in which the arrest of the disease may be possible, or in which there is a chance of causing the disappearance of the growth. It appears that in regard to tumours that have a good blood-supply, if the patient be in good condition, and the growth is not larger, say than 5 per cent. of the body-weight, hope may be entertained, provided we invoke, in certain cases, the aid of surgery and radiation.

In order that we may not be misunderstood it should be stated that, whenever possible, we like to remove as much of the growth as we can before commencing treatment with lead, but, of course, such a procedure is not eradicative. There is no doubt that lead, as might be expected, is quantitative in its method of action. Although we do not believe that small doses of lead increase the rapidity of the growth, as do X rays and radium, it is quite useless to give an insufficient quantity; hence our reason for wishing first to get rid of as much of the malignant tissue as possible.

### *Nature of the Preparation Used.*

From November, 1920, to April, 1924, a number of imperfectly colloidal preparations of lead were used; still some appear to have been quite effective. Nevertheless, in the incompletely colloidal state the general toxic effects on the patient appeared to be more serious and common than now, when we use the metal properly protected; but, as the method of dosage has varied, it is impossible to make an accurate comparison.

In the earlier preparations we employed lead iodide in which the iodine was obtained from thyroiodin by the action of lead on this substance. A compound of lead with hæmoglobin, which we hoped would protect the blood and the blood-forming organs, was also used. This, however, undoubtedly had toxic properties of its own, no doubt due to the hæmoglobin obtained from animals, which substance appears to be more or less generically specific. We also used compounds of lead oleate and lead "morrhuate" for intramuscular injection. These were abandoned because they appeared to be unabsorbable.

Finally, Prof. W. C. McC. Lewis and his associates, Dr. J. W. Corran and Dr. M. Jowett, found it possible to make a good electrical suspension of metallic lead in an aqueous medium with gelatin (0·4 per cent.) and calcium chloride (0·027 per cent.) by Bredig's sparking method, as described and discussed two years ago.[2] We at present employ about 20 amps., under 70 volts. The final product after centrifugalisation to get rid of particles larger than 0·2 $\mu$ is made hypertonic by the addition of sodium chloride (2·0 per cent.), potassium chloride (0·05 per cent.) and calcium chloride (0·027 per cent.), and is sterilised by boiling. The strength of this preparation, known as $S_7$, is adjusted by dilution with the sparking solution to contain 0·5 per cent. of Pb.† We are not yet satisfied about the stability of the preparation now used, and the physical chemists hope to improve it, and eventually to render it sufficiently stable for distribution.

It is still sometimes asked, although we have previously explained the matter, why we use a colloidal preparation. We have already indicated that lead ion is very toxic.[6] Had we pursued the question we might have discovered a preparation better than lead morrhuate for the administration of lead intramuscularly, but we are sure it would not have been so effective as the intravenous injection of perfectly protected lead. The whole object of using a colloidal preparation is to deliver the lead slowly to the highest bidder, as it were, among the body tissues—this we believe to be the malignant cell—in quantities with which they are able to deal as it is released to them. It is highly probable that our preparation dissociates quite slowly in the blood stream, and this matter is under investigation by Prof. Lewis and his associates.

### *Methods of Introduction and Dosage.*

*Intravenous Injection.*—It seems obvious that in the treatment of existing malignant neoplasia the best method of attacking the disease is through the blood stream; it is, indeed, the most rapid and inevitable way of reaching all the tissues of the body. Moreover, by the administration of a drug intravenously, we know that it is at least taken up by the tissues or immediately excreted. Drugs administered by the mouth, or injected into the tissues, are not always absorbed. Nevertheless, with regard to such

† Apart from the voltage, amperage, and percentage figures, which are of relative importance only, for they have undergone, and are still undergoing, frequent alteration—the figures given here being merely those recently in use—the whole method was described and discussed, as stated, two years ago in sufficient detail for anyone to have repeated and extended the work already done. It has, therefore, been a matter of considerable surprise to us to hear on all sides that the "method of preparation" has not been published. Such a statement reflects but little credit on those responsible for it, and demonstrates either that these critics have failed to read what has been published—an unpardonable omission—or that they are so ignorant of elementary physical chemistry that they have been unable to understand.—W. B. B.

growths as epitheliomata and scirrhus carcinomata of the breast, there is always present the difficulty that vessels are not in close proximity to the growing cells; indeed, this may be a contributory reason why the disease is present at all.[5] With sarcoma the matter is somewhat different, but in this disease, again, it is common to find large masses of growth inadequately supplied with blood-vessels.

As already indicated in a previous paper,[6] except at the very beginning, for about three years and a half we employed small doses not exceeding 0·04 g. of lead, and generally much less than this. Looking back we see that our earliest cases appear to have done well, but with a reduction of dosage good results became fewer and chronic poisoning more frequent. Subsequently to our work on the action of lead on the chorionic epithelium of the rabbit,[5] during which we found that the dose inevitably lethal to this epithelium was half of the fatal dose to the mother, we have employed what we describe as "massive doses."

Generally speaking, it may be said that in a patient of average size and of average susceptibility, and without hepatic or renal disability, a fatal dose of lead, intravenously administered, is in the neighbourhood of 35 to 40 c.cm. of the colloidal solution we now use—that is to say, the fatal amount of lead is a little more than 0·2 g. when administered in a single dose. It must, however, not be forgotten that patients with large tumours are less subject to the bad effects of lead than patients whose growth is small in proportion to the body-weight. We have seen patients with huge malignant growths tolerate lead in a surprising fashion, and we have, as previously stated, been able to analyse tumours from patients to whom large quantities of lead had been administered. In these investigations we found in the tumour a quantity of lead which demonstrated clearly that the greater proportion of that administered must have been attracted to it.

We observed that the administration of a total quantity of 0·27 g. of lead in repeated doses spread over a protracted period of about 18 months produced a certain cumulative toxic effect on the patient, which, as we have previously said, was difficult to combat. With the massive doses it is possible to give approximately 0·6 g. of lead in seven or eight doses during a period of four months without producing any serious ultimate consequences whatsoever to the patient. As a rule, our present practice is to give about four injections of 10–20 c.cm. of $S_7$ at intervals spread over a period of about six weeks, and subsequent doses are regulated according to the general and local conditions of the patient. Still, even at the time of writing we are experimenting with different quantities and intervals.

For the injection of this preparation, which is of a black or slatey colour, according to the amount of hydroxide and carbonate it contains as the result of contact with air, we have found the attachment shown in the figure, which we had made, and which we call an "interceptor," extremely useful; it is of glass and is fixed between the nozzle of the record syringe and the needle. The surgeon is thereby enabled to see the ascent of blood when the vein is reached; this was impossible before we used the interceptor. Those who have had an experience, such as we have, of many thousand intravenous injections, know the difficulties that may arise in the case of a fat woman.

*Ionisation.*—We have long used this method for the introduction of lead ions into superficial neoplasms. In certain cases in which there is extensive lymphatic invasion, such as is seen with carcinoma of the breast, there may be a diminution in the pain and a softening of the parts. Incidentally, we may call attention to the fact that Borrel [9] has recently shown that of all the metals used for the ionisation of rat sarcoma, lead is not only by far the most effective, but almost invariably causes the disappearance of the tumour. Dr. H. E. Annett, working with us, has obtained similar results by the ionisation with lead of this type of tumour.

There is some doubt as to the penetrating power of the lead ion in these circumstances, but we cannot disregard the results we have occasionally seen. The quantity of lead that is passed into the tissues in the circumstances in which we have used this method has amounted to 0·003 g. at one sitting of 15 minutes. In one or two cases we have ionised the tumour itself, or the site from which it had been removed by the insertion of one electrode into the mass or cavity, as the case may be.

*Intramuscular Injection.*—We shall not discuss the method of intramuscular injection which has been employed, for we have ceased to use it for the present, owing to the pain caused and to the unabsorbable nature of the material.

## ACCOUNT OF CASES TREATED.

In all 247 patients were seen in the period under review. Of these 227 have received treatment. In Table I. an age classification is given; in Table II. the types of malignant disease treated are shown; in Table III. the ultimate, or present, fate of the patients is made clear; and in Table IV. is shown the sex and the type of disease that has been benefited by treatment.

TABLE I.—*Age Classification.*

| Years. | Males. | Females. |
|---|---|---|
| Under 10 | 4 | — |
| 10–20 | 4 | — |
| 20–30 | 6 | 5 |
| 30–40 | 7 | 18 |
| 40–50 | 16 | 43 |
| 50–60 | 21 | 55 |
| 60–70 | 13 | 23 |
| Over 70 | 4 | 8 |
| | 75 | 152 |

Number of patients: males, 75; females, 152; total, 227.

TABLE II.—*Sites of Growths and Sex of Patients.*

*Carcinoma:* Males, 53; females, 136.
*Sarcoma:* Males, 22; females, 16.

| Sites of the growths. | Cases. | Females. | Males. |
|---|---|---|---|
| Mouth and tongue | 9 | — | 9 |
| Cheek | 2 | — | 2 |
| Œsophagus | 8 | 1 | 7 |
| Stomach | 16 | 4 | 12 |
| Small intestine | 1 | 1 | — |
| Large intestine | 7 | 5 | 2 |
| Rectum | 18 | 7 | 11 |
| Liver and bile passages— | | | |
| Liver | 2 | 2 | — |
| Gall-bladder | 2 | 1 | 1 |
| Pancreas | 3 | 1 | 2 |
| Nose and nasopharynx | 3 | 2 | 1 |
| Larynx | 2 | 2 | — |
| Lungs and bronchi | 1 | 1 | — |
| Mediastinum and mediastinal glands | 5 | 3 | 2 |
| Breast | 49 | 49 | — |
| Uterus— | | | |
| Body | 7 | 7 | — |
| Cervix | 38 | 38 | — |
| Ovary | 11* | 11 | — |
| Vagina and vulva | 3 | 3 | — |
| Male genitals | 1 | — | 1 |
| Kidney | 2 | 1 | 1 |
| Bladder | 1 | — | 1 |
| Bones: Upper jaw— | | | |
| Carcinoma | 5 | 3 | 2 |
| Sarcoma | 1 | — | 1 |
| Scapula | 3 | — | 3 |
| Ilium | 2 | 1 | 1 |
| Femur | 5 | 1 | 4 |
| Humerus | 1 | — | 1 |
| Tibia and tarsus | 1 | — | 1 |
| Orbit | 1 | — | 1 |
| Glands— | | | |
| Neck | 6 | 2 | 4 |
| Axilla | 4 | 4 | — |
| Subcutaneous tissues | 7 | 2 | 5 |

* Two were sarcomata.

[5] Wolbach, S. B.: Jour. Med. Research, 1909, xxi., 415.

[9] Borrel, A., Conlon, A. de, and Boez, L.: Compt. Rend. de la Soc. de Biol., 1922, lxxxvii., 1118.

TABLE III.

*Fate of Patients: Nov. 9th, 1920–Nov. 9th, 1925.*

| | Cases. |
|---|---|
| 1. Admitted, but died before treatment could be commenced | 20 |
| 2. Died before treatment could be completed | 50 |
| 3. Died of intercurrent affections | 3 |
| 4. Died after treatment (including two deaths from acute nephritis the result of lead poisoning) | 106 |
| 5. Died as a result of extensive destruction of growth by lead | 4 |
| 6. Too recent for results to be estimated | 14 |
| 7. Complete treatment refused, but patients are living normal lives | 9 |
| 8. Disease completely arrested | 10 |
| 9. Believed cured, and treatment stopped | 31 |
| | 227 |

A brief discussion of these groups is necessary.

*Cases which Died before Treatment could be Commenced.*

In our anxiety not to refuse any case that came to us for treatment, we admitted some who were so ill that they died during the few days devoted to the preliminary investigations of their general condition—before any lead could be administered. In reviewing the statistics of the cases treated, it must constantly be borne in mind that nearly every case which came to us had been condemned as hopeless, every other known avenue of treatment having previously been explored.

*Cases which Died before Treatment could be Completed.*

Death took place in a large number before adequate treatment could be given, the general condition of the patients being unsatisfactory from the first. In 43 cases death occurred before 0·2 g. of lead had been administered, and many of these received considerably less than this quantity, the average amount being 0·116 g. This group should, therefore, be completely excluded from any estimation of the beneficial effects of the method of treatment under discussion.

*Cases that Died of an Intercurrent Affection.*

The following are two examples.

CASE 2.—A female, aged 61, was admitted with a large growth in the right breast, ulcerated, and fixed to the chest wall. There was a large mass in the axilla, and the supraclavicular glands were involved. She had only five injections, making a total of 0·2 g. of lead. A very considerable improvement took place; the growth appeared to be shrivelling up, and the glands in the axilla became softer and more discrete. The patient returned home for Christmas (1920), contracted pneumonia, and died. Her own doctor, who examined the growth immediately after death, reported that it had shrunk to about one-third of the original size.

CASE 26C.—The patient was a man, 71 years of age, with four months' history of increasing dysphagia with persistent loss of weight. X ray examination showed marked obstruction at the cardio-œsophageal opening. The Wassermann reaction was negative. The total quantity of lead given amounted to 0·28 g. There was marked clinical improvement, and the patient was able to swallow tolerably well, but he died from pneumonia six months after the commencement of treatment.

*Cases which Received a Considerable Amount of Treatment but Ultimately Died.*

This group of cases—necessarily a large one—may be viewed from two points: (1) lead had no action on the malignant growth present; (2) our methods of treatment are imperfect.

There can be little doubt, we think, in view of the clinical evidence obtained, that lead has specific action on malignant neoplasia *if it can reach the growing cells*, so we can only conclude, and indeed we know, that our methods of treatment are far from perfect, and that some of our failures are due to this cause, especially in the early cases, when we often gave too small doses, or for some reason lead failed to reach the growth in a sufficient quantity to cause arrest or disappearance.

From what has been said it will be clear that the more avascular a tumour is the less chance there is of our dealing successfully with it, unless we can induce the malignant cells to take up the lead. We have employed a variety of expedients, such as fibrolysin and thyroiodin for this purpose. Nevertheless, this difficulty still remains to be overcome.

In this group two cases from our series may be taken to illustrate another difficulty. Both these patients had protracted treatment, but the total amount of lead given was not great, as at that time we were using only small amounts of colloidal lead. They both showed very definite signs of improvement, but for various reasons the patients were unable to continue the injections.

CASE 114.—The patient was a youth, 18 years of age, with advanced sarcoma of the scapula. X rays showed that the scapula was almost completely decalcified, and a portion of growth removed for section confirmed the diagnosis. After 0·13 g. of lead had been administered together with a few exposures to X rays, the tumour began to disappear, and very shortly afterwards the whole scapula re-formed and ossified, as shown by a series of skiagrams. The patient then ceased treatment for a time, but returned two months later with a small, but obvious, recurrence. In view of the fact that X rays had been helpful before, it was decided not to give the patient any lead, but to try the effect of X rays alone. The tumour did not respond, so injections of colloidal lead were again given, and a second time the tumour began to disappear and the scapula to re-form. The patient, who lived at a distance, was unable to continue the treatment, and again there was a recrudescence of the growth, metastases developed, and he died.

CASE 125.—This was a school-boy, aged 13 years, who had had his leg amputated two months previously for a sarcoma in the lower end of the femur. He was sent to us almost before the incision had healed with a recurrence in the cut end of the bone. He received 0·13 g. of lead, and X ray treatment to the stump. All the swelling disappeared, and a skiagram showed that the bone end was practically normal. He was discharged as cured. Twelve months later he reappeared, with large secondary masses in the abdomen and chest, but the condition of the stump itself was quite satisfactory. To our amazement we heard many months later that he was still alive.

In the two foregoing cases we hoped that we had effected a cure, but in both instances we were afraid to push the treatment too far owing to the youth of the patients, although neither of them showed any dangerous sign of poisoning.

Another patient, for certain reasons, was unable to carry on with the treatment; and yet another, feeling himself so well, did not come to be seen by us until it was very obviously too late to resume the administration of lead.

We do not in these remarks intend to disguise the fact that the treatment with lead definitely failed in most of the cases in this group to bring about the desired result, although it must be said that in many changes occurred in the growths which we regard as significant.

*Cases in which the Patient has Died as the Result of Extensive Destruction of the Growth by Lead.*

In the following cases the patients died as the result of the destructive action of lead on malignant neoplasms present. There were four definite instances of this.

CASE 153.—A young man, 22 years of age, who four months previously had had a partial gastrectomy for a small pyloric tumour, which subsequently proved to be a sarcoma, when admitted to our care, had an extension of the disease in the stomach, and the tumour was then of the same size as that of a football. After the administration of 0·09 g. of lead the abdomen suddenly became quite flat and no tumour could be felt. Two more injections were given, making a total of 0·15 g. of lead. One day, just three weeks after the commencement of the treatment, the patient complained of great abdominal pain, and became very pale and collapsed. He died the same night. At the post-mortem examination Prof. Ernest Glynn found some dark fluid blood in the peritoneal cavity, and that the tumour was replaced by a large black necrotic mass of the consistency of mud. The only part of the original growth from which a section could be made subsequently was a piece which had invaded the liver by direct extension.

CASE 12.—The patient was an old man of 77 years of age who had a history of a swelling in the buttock for the previous two years. On admission he was found to have an elastic swelling of the same size as that of a cocoanut under the gluteal muscle. A small piece was removed for

section and was shown to be a very vascular sarcoma. Four injections, equivalent to 0·1 g. of lead, were administered. Three weeks after the commencement of the treatment he had considerable hæmorrhage from the exploratory incision. Blood was transfused next day, but he did not recover. The tumour was exposed after death and was found to be completely necrosed in its centre, and in the large cavity formed there was a mixture of blood-clot and broken-down growth.

CASE 174.—The patient was a woman, 57 years of age, who had a postcricoid carcinoma. She was quite unable to swallow; her voice, however, was unaffected. A preliminary gastrostomy was done, and in view of subsequent events it would have been better if a preliminary tracheotomy had also been performed. We administered intravenously *0·2 g. of lead in one dose.* Hæmaturia followed, but the most serious symptom was dyspnœa, which rapidly increased. Three or four days later the trachea was opened, but the patient died a few hours afterwards. At the post-mortem examination the growth was found to be very œdematous and sections showed acute necrosis of the malignant cells which were lying in an œdematous stroma of loose connective tissue.

CASE 29C.—The patient was a man, aged 58 years, with a large sarcoma of the left femur. Altogether he was given 0·34 g. of lead, including an initial massive dose of 0·2 g. An incision was made in the skin and 8 oz. of blood-stained material withdrawn on the day before he died. At the autopsy the tumour was found to have liquefied, and practically the whole of the original site of the tumour was occupied by hæmorrhagic necrotic material.

*Too Recent for Results to be Estimated.*

Nothing need be said of the cases—14 in number—in which treatment had recently been instituted.

*Complete Treatment Refused, but Patients are Living Normal Lives.*

It is an extraordinary fact that many patients, although aware of the nature of the disease from which they are suffering, frequently refuse to continue treatment. Either they lived at too great a distance to reach Liverpool easily, or the treatment already administered has produced colic, vomiting, and other unpleasant symptoms, which they are not prepared to bear again. At the time when these figures were collected, the nine patients were living and leading normal lives. We have not had information since that date that they are doing otherwise.

*Disease Completely Arrested.*

In a number of cases, especially when the tumour was large, the effect of treatment appears to have been that the growth was completely arrested, but did not disappear. In such circumstances the patients have shown remarkable constitutional improvement, and have increased considerably in weight, sometimes by so much as 3 st.; and symptoms, the result of the disease, have disappeared, except such inconveniences as those produced by an intra-abdominal tumour of a certain size. The arrest of growth in the case of sarcoma may be very striking, and is undoubtedly evidence of the inhibitive action of lead on the development of such tumours. It is impossible, of course, to say that there will never be a reawakening of active growth in these circumstances, and possibly it would be good surgical practice to remove the latent neoplasm. Sometimes this would be a very difficult and dangerous proceeding, and the patient undoubtedly would prefer to continue in the state of improved health she has gained rather than run the risk of a fatal issue. There are 11 cases in this group, and their future welfare will be a matter of great interest and importance.

*Cases Believed Cured.*

It is quite impossible to define the *cure of cancer.* To clinicians, though apparently not to laboratory workers, it is well known that the possession of a malignant growth successfully treated by surgical or other procedures does not confer on the patient immunity from subsequent neoplastic developments. In the experience of all surgeons a number of such cases occur; consequently it is clear that every patient who is cured of one malignant growth may develop another and require further treatment. This is the first point. The second point in regard to the difficulty of estimating what may be considered a true cure is the fact that a primary growth, apparently successfully treated, may develop on the same site, or in the form of a metastasis very many years later. It is evident, therefore, that the five-year period usually allotted to the demonstration of a cure of previously existing cancer is not valid, although flattering to surgical statistics. We therefore think it right and proper to describe our cases, which are now apparently perfectly well and give no evidence of disease in any part of their body, as "believed cured."

In Table IV. the cases summarised in sections 7, 8, and 9 of Table III. are shown in respect of sex and the nature of the malignant disease from which they suffered.

TABLE IV.—*Cases in which the Growth has been Completely Arrested, or the Patient is Believed to be Cured.*

Sections 7, 8, and 9 from Table III., 50 cases.

*Sarcoma.*—Number of cases, 6 (female, 4; male, 2).

*Site of Growth.*—Female: (1) small intestine; (2) uterus (body); (3) retroperitoneal tissue; (4) ovary. Male: (5) scapula; (6) connective tissue of thigh.

*Carcinoma.*—Number of cases, 44. Female: primary carcinoma, 32; secondary carcinoma, 7. Male: primary carcinoma, 4; secondary carcinoma, 1.

*Situation of Tumour.*

*Primary Carcinoma.*

| | | | |
|---|---|---|---|
| Breast | 14 | Body of uterus | 1 |
| Cervix | 9 | Œsophagus (male) | 1 |
| Rectum (female, 2; male, 1) | 3 | Fauces and pharynx (male) | 1 |
| Ovary | 2 | Gall-bladder (male) | 1 |
| Pancreas (female | 1 | Adenocarcinoma of fibro-myoma and pelvic cellular tissue | 1 |
| Vulva | 1 | | |
| Stomach (female) | 1 | | |

*Secondary Carcinoma.*

| | |
|---|---|
| Glands in neck and axilla (secondary to breast) | 5 |
| Tibia (secondary to testicle) | 1 |
| Ovary (secondary to breast) | 1 |
| Peritoneum | 1 |

Brief summaries of the histories of a few of the more remarkable of the cases contained in Table IV. may be given. It is impossible in a paper of this character to give the complete histories of all the cases.

*Examples of Cases in which the Growth has been Completely Arrested.*

These cases give indication of complete recovery, but have not been treated for a sufficient length of time to be regarded as cured. Every one of them had relatively large growths, and in one case the mass filled up the whole of the pelvis and a large portion of the abdomen.

CASE 178.—The patient was a woman of 38, who four months prior to admission complained of abdominal pain. A mass was discovered in the pelvis, and laparotomy was performed by a London surgeon, who found a very large vascular growth filling the whole of the pelvis and most of the lower part of the abdominal cavity. On account of the danger from hæmorrhage no portion of the tumour was removed even for section. On admission there was a large soft central tumour extending above the umbilicus, irregular in outline and filling the pelvis. She came under our care in December, 1924. A further laparotomy was done, and a small piece removed for section. Examination proved the tumour to be a short spindle-celled sarcoma, probably arising in the ovary. She was given 0·15 g. of lead at one injection. This caused most distressing toxic symptoms, both gastro-intestinal and urinary. Vomiting persisted for over a fortnight. Twelve days after the injection the abdomen was quite flat and only a small lump could be felt above the pubis. We should have liked to give her a further injection, but in view of the very serious symptoms which developed after the first it was considered necessary to delay treatment for a considerable time, and during the latter part of this period the lump increased in size. She has had further treatment, and although a mass of moderate size is still palpable, yet she looks and feels well, and is able to go about in the ordinary way.

CASE 185.—The patient was a young woman, 20 years of age, who herself discovered a lump in the abdomen. She came under our observation in March, 1925, when a laparotomy was done. A large retroperitoneal sarcoma was found,

which was too vascular to be incised; a lymph gland was removed for diagnostic purposes. This was subsequently reported by Prof. Glynn to be sarcoma. Since that date she has had 0·65 g. of lead. Her general condition is very good. The lump is considerably smaller and is causing no symptoms.

CASE 177.—A woman, aged 52 years, was referred to us in November, 1924. She had some glycosuria, considerable jaundice, and there was a lump in the right hypochondrium. A laparotomy was performed, and a large mass felt in the head of the pancreas, and an anastomosis was done between the gall-bladder and the duodenum. She was subsequently treated with intravenous injections of colloidal lead. The jaundice has disappeared, and the glycosuria is considerably improved, and with the exception of one or two febrile attacks (? cholangitis) her general health is now very good. Distressing toxic symptoms developed after the last injection. The patient has gained over half a stone in weight. A section recently obtained shows scattered groups of a few atrophic cancer cells embedded in fibrous tissue.

*Cases Believed Cured and Treatment Stopped.*

There are 30 cases which come into this group—3 males and 27 females. In a majority they were treated with injections of colloidal lead only. Two of them were treated with X rays in addition. Twelve cases had partial operation—that is to say, a removal was attempted but a considerable amount of malignant tissue was still left behind, and the patient was subsequently treated with lead. The following three cases are examples of the type in which the operation was incomplete, and which were subsequently treated with lead, with a satisfactory result.

CASE 9C.—A woman, aged 34 years, with malignant disease of the rectum. The rectum was excised, and the sigmoid brought down to the anal orifice, but a large mass of growth was left in the pelvis. Section showed it to be a typical columnar-celled carcinoma. Subsequently she was given 0·265 g. of lead. She is now very well and has gained weight, and there is no evidence of malignant disease.

CASE 24C.—The patient was a woman aged 39 years. She had a large ulcer high up on the posterior wall of the stomach behind the pancreas, causing hour-glass contraction. Partial gastrectomy was done and gastro-enterostomy, but there was much infiltrated tissue left behind. Section showed it to be a typical spheroidal-celled cancer. She was given 0·385 g. of lead. This patient has done well; she has gained weight and her appetite is good. There is no sign of malignant disease.

CASE 51.—The patient was a woman, aged 44 years, who two and a half years previously had had a radical operation on the left breast for carcinoma. On admission the abdomen was very distended and a mass could be felt in the pelvis. At the operation malignant ovarian tumours on both sides were removed. There were malignant nodules in the neighbourhood of the cæcum and in the omentum, which were not removed. She was subsequently given 0·765 g. of lead. This was over two years ago; she is still quite well and has gained considerable weight. There is no sign of recurrence.

Of those treated with lead and X ray—

CASE 140 is a good example. The patient was a man, aged 34 years, with a large sarcoma of the scapula and a mass of glands in the axilla, one of which was removed for section and found to be a mixed-celled sarcoma. He was given 0·22 g. of lead and several X ray exposures to the scapula only. In three months the scapula was normal. Altogether he has had 0·24 g. of lead, the last injection being given over 18 months ago. He is quite well, and there is no abnormality whatever of the scapula. His general health is good and he is able to follow his employment.

The following are examples of cases treated with injections of colloidal lead only.

CASE 117.—A woman, aged 57 years, who 15 months previously had had a radical operation for a carcinoma of the right breast. Fourteen months later the supraclavicular glands were removed. She was sent to us on account of a mass above the clavicle and in the axilla. She was given 0·19 g. of lead. The lumps have disappeared. The last injection was given over two years ago and she is still well and there is no recurrence.

CASE 84.—This patient was a young woman, aged 27 years, who in November, 1922, was operated upon for intestinal obstruction. A growth in the small intestine was found, and a lateral anastomosis was performed, no attempt being made to remove the tumour. A section of the growth showed it to be a lympho-sarcoma. She received 0·44 g. of lead. Her general condition is very good and there is nothing abnormal in the abdomen.

CASE 119.—This patient was a woman, aged 50 years, with ascites and small nodules of adenocarcinoma in the liver and omentum. No primary growth was found. She had to be tapped each fortnight and an average of 15 pints of fluid was withdrawn on each occasion. Subsequently she received 0·345 g. of lead. For the last 20 months the patient has been and looks very well. There is no sign of recurrence or of free fluid in the abdomen, and she is able to do her own housework.

CASE 50R.—This patient was a married woman, 55 years of age. She complained of irregular vaginal hæmorrhage. On examination she was found to have three nodules of considerable size in the vagina and an enlarged uterus. Hysterectomy was performed and a portion of one of the vaginal nodules was removed for section. The growth in the uterus was found to be a columnar-celled carcinoma and the piece of tissue removed from one of the vaginal nodules also proved to be adenocarcinomatous. She was treated, and in all received 0·52 g. of lead up to November, 1925. The masses in the vagina disappeared and her general health is in every way satisfactory. It is now (February, 1926) 13 months since the treatment was commenced, and a section recently prepared from a piece of hard tissue on the site of one of the pre-existing nodules shows nothing but fibrous tissue.

CASE 1.—This patient was a young woman, 36 years of age, who was sent to us with a large fungating carcinoma of the left breast. It was attached to deeper structures and there was a mass of glands in the axilla. Any operation was considered impracticable, but a portion of the edge of the ulcer was removed for section and proved to be carcinoma. She received 0·32 g. of lead. The ulcer healed in a fortnight and the whole tumour disappeared within six weeks. Subsequently a piece of breast tissue was removed and histological examination showed fibrous tissue only. At present—nearly five years since the treatment ceased—the patient is quite well and on palpation the breast appears to be normal. During this period she has had two babies and has nursed them at this breast. She comes to see us periodically to report herself.

## DISCUSSION OF CASES TREATED AND THE TREATMENT ADOPTED.

Limitations of space do not permit us to do more than comment in a general way on the patients treated. If, in estimating the value of the treatment of malignant disease by lead we exclude, for reasons already given, the cases in Groups 1, 2, 3, 5, and 6, we are left with Groups 4, 7, 8, and 9, from which to draw our conclusions. In allotting to these groups cases suitable to them we have erred on the side of caution. An example of this may be given in order to demonstrate that we have attempted not to over-estimate our results.

CASE 129.—The patient, aged 68, came to us in an emaciated condition, having a few months previously had a gastrostomy performed subsequently to complete occlusion of the œsophagus by cancer. We have not a section of this case, but the Wassermann reaction was negative. He had been operated on by Mr. Thelwall Thomas and also seen by Mr. Somerville Hastings, both of whom had no doubt whatsoever of the nature of his disease, which was also demonstrated by X ray examination. It is well known that few patients have ever lived more than nine months after gastrostomy in these circumstances and even this period is rarely covered. It is now two and a half years since the gastrostomy was performed in 1923, and the patient is in robust health and has put on several stones in weight. This man we should have been perfectly justified in putting either in Group 8 or 9. We have, however, preferred to put him in Group 7, as he has not been as conscientious as he should have been in continuing the treatment, which has now been stopped, having altogether had a little under 0·5 g. of lead.

We find in Group 4 a large number of patients who died of malignant disease in spite of a considerable amount of treatment. In these cases we may be said to have failed; yet the cause of failure may be attributed in many instances to the fact that the patient did not attend regularly for injections.

In many of the earlier cases failure was possibly due to our inexperience, which led us to give the metal in too small doses—a mistake only remedied in the last 18 months. Moreover, undoubtedly by slow poisoning in some of these early cases we reduced the general health of the patient, and rendered her less able to resist the disease. It must, however, be emphasised that in a large number the growth was considerably affected and altered by treatment, but

by the time that stage had been reached it was impossible to continue treatment. Cases in Groups 7, 8, and 9 may be regarded as successes, although, as in all cases of supposed cure of cancer, time, and this time the rest of the life of the patient, alone can prove the truth of any statement on this matter. In at least four of our cases recorded as failures in Group 4 the growths disappeared completely, and the patients considered themselves cured. Treatment was stopped, but the condition recurred later.

As one of us has stated on a previous occasion,[2] X rays appear to exert an appreciably greater effect on a superficial tumour after treatment with lead. This is of great importance, as in suitable cases the assistance of X rays, after the patient has had as much lead as she can tolerate, may be a factor of moment in the treatment of the case.

With regard to operation followed by intravenous injections of lead, it has already been stated that, whenever possible, a very large tumour should be reduced in size, as the action of lead appears to be quantitative. When, however, a more or less radical operation, such as may be practised for a breast cancer with comparative ease and safety, is performed, the patient may be saved from a recurrence if injections of lead be given immediately after operation. Our results after vaginal hysterectomy, without the possibility of eradication, give evidence of the value of this procedure.

We recognise that those who commence the treatment of patients with lead will almost certainly be disappointed; for, indeed, they may have a series of failures before they obtain, if ever, a beneficial result. In any case, in spite of the fact that we have seen extraordinary happenings, they must not too confidently be expected. Moreover, we have never attempted to exclude operative and X ray treatment where these could be of assistance, and in every case we have only had in view the ultimate cure of a patient who generally had been abandoned to her fate.

It will be seen, therefore, that although we believe that lead is of great value in the treatment of malignant disease, either alone or in conjunction with other methods of treatment, we realise not only that it is but a substitute for something better, but also that the preparation made is far from perfect.

For all these reasons we would have preferred to work quietly on and to have kept the matter in our own hands until we felt reasonably certain that we could no further improve the method, and that the personal factor in regard to treatment was less important than it is to-day. We have no doubt whatever that, if lead were to come into the hands of all those who are clamouring for our preparation, the whole method would be condemned as useless.

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### COMMENT BY Dr. J. G. ADAMI.

I have followed with the deepest interest the developments in Prof. Blair Bell's method of treatment ever since he communicated to me its nature and showed me his first remarkable case of disappearance of an extensive and ulcerating carcinoma of the left breast. That was in the winter of 1920–21. The secondaries in the axilla had then disappeared; there was still a small area of induration to be felt in the outer part of the breast and the site of the old healed area of ulceration was still recognisable. Since then he has kept me fully advised as to each successive step. I have repeatedly seen his cases in the course of treatment, and I have been freely informed regarding the failures as well as the apparent successes, being a member of his first advisory committee and then becoming a member of the Executive of the Liverpool Cancer Research Committee established in February, 1923. Ther personnel of that Committee and of the large coöperative research Clinical Staff is given in Prof. Blair Bell's article in THE LANCET of Feb. 9th, 1924, p. 267.

On the mornings of July 15th, 16th, and 17th, 1925, as a medical member of that Executive I attended, with others, a review or survey of a number of old patients who had from the beginning been subjected to Prof. Blair Bell's treatment. Of these I saw and took notes of 30. Letters were read from 10 others all declaring themselves in good health, who for one cause or another could not respond to the call.

The main impressions left upon me by this very remarkable series of cases are the following.

1. The healthy, and indeed almost florid, appearance of the majority of the patients. There was complete absence of cachexia, absence also of any evidence of plumbic anæmia.

2. Absence of wrist-drop or other sign of lead poisoning; only one patient complained of some dimness of vision.

3. The rise in weight and good bodily condition of the majority, and, with this, their repeated testimony to the fact that they were now actively at work at their usual avocations.

4. The absence of evidence of recurrence. I had expected after this treatment, just as after X rays and radium, to be confronted with a fair proportion of recurrences within a year. There was not a single example in this group. The problem evidently resolves itself into this: What is the dose of lead which will surely kill off all the cancer cells without inflicting too grave an injury upon the other tissues of the body?

5. I could not but wonder whether it had been given to any other physician or surgeon to pass in review in three days 30 cases of recurrent and inoperable malignant growth, and to find one and all so actively going about their work in such apparently excellent health, with such absence of evidence of progressive disease. And this, even though there had been a mortality (in the main of those presenting themselves for treatment with the condition too far advanced) of more than 60 per cent. But then 60 per cent. or even 70 per cent. is a material reduction upon, say, 95 per cent.

I could not but be impressed with the fact that here we were dealing with an important step forward in the direction of ultimate control of what is one of the gravest ills which inflict mankind.

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### CONCLUSIONS.

1. The results of treatment of malignant growths with preparations of lead add further testimony in support of our views of the nature of malignant neoplasia. These views have received confirmation, as shown in the previous papers, in all the directions that have been explored.

2. Much work remains to be done in regard to discovery of a more therapeutically active preparation of lead, which is at the same time less toxic generally.

3. All types of malignant growths are probably amenable to the beneficial influence of lead, provided the metal can reach the malignant cells in sufficient quantity.

4. Adjuvant surgical and radiological measures in suitable circumstances may be employed with considerable advantage. When the growth has been partly, or apparently entirely, removed, intravenous injections of lead should be employed within a few days of the operation when possible.

5. The method of treatment is difficult, and to some extent dangerous, and can only be safely employed by those who are thoroughly experienced in the work, and have laboratory facilities at their disposal.

We cannot conclude this series of contributions without expressing the deep sense of gratitude with which the whole staff, both clinical and experimental, of the Liverpool Cancer Research Committee, regard the interest and generosity of the following gentlemen who have not only made themselves responsible for the conduct of the work, but have also extended to us the sympathy which is so necessary in dealing with problems as difficult as that of cancer: Dr. J. G. Adami, Mr. Rex D. Cohen (treasurer), Mr. A. B. Earle, Sir Robert Jones, Mr. C. Sydney Jones,

Mr. F. C. Minoprio, Mr. F. T. Paul, Sir James Reynolds, Colonel J. J. Shute, Mr. J. A. Smith (chairman), Mr. W. C. Stapleton, and Mr. R. Wilson. We wish also to thank Mr. E. Carey, the secretary, Miss Barnes and Miss Denby, assistant secretaries to the Cancer Research Committee, and the laboratory assistants, especially Mr. Manby and Mr. Sephton, for their ungrudging assistance.

## SOME RECENT WORK ON THE FUNCTIONS OF THE SPLEEN.

*A Lecture given to the Leeds University Medical Society on March 9th, 1926,*

BY JOSEPH BARCROFT, C.B.E., F.R.S.,
PROFESSOR OF PHYSIOLOGY, UNIVERSITY OF CAMBRIDGE.

ABOUT 15 months ago, in an address delivered in Manchester on Some Aspects of the Activity of the Spleen,[1] I put forward in a preliminary way a view of the splenic function which was at once old and new. New because it did not figure at all in the then current literature and thought, old because it can be stated in words published by Henry Gray in 1854.[2] These words are as follows:—

"The function of the spleen is to regulate the quantity and the quality of the blood . . . the most satisfactory proof that we can possess is that the spleen really does contain, under certain circumstances, a varying amount of blood and that that amount is to such an extent as to justify us in concluding that the organ serves to regulate its quantity."

Probably I shall be expected to take up the story where I then dropped it and to state shortly what 15 months of work have added to the knowledge which we had at the commencement of 1925.

### *Comparative Size of the Spleen under Varying Conditions and After Death.*

The point of interest at that time was to arrive at some sort of judgment as to whether the spleen as it existed in the intact and normal animal was comparable in size to that seen in the same animal post mortem. The reason for this inquiry was as follows. There seemed good ground for the supposition that the spleen contracted, expelling red corpuscles from the spleen pulp into the general circulation under conditions of bodily stress, but the spleen seemed to be so small as to make this phenomenon one which was so trivial as to be of little importance. It seemed to be, if I might so say, rather a "property" than a "function" of the organ. A couple of experiments had sufficed, however, to show that under certain conditions the spleen at death was only about one-third or one-quarter the size of the spleen during life. Clearly a number of questions were raised by this observation: (1) How far were the conditions special to the two experiments performed, or how far were they general? (2) Granting that the shrinkage was due to the expulsion of blood constituents into the general circulation, what were these blood constituents? For instance, was the material expelled simply blood? or (3) Was there a preponderance of either corpuscles or plasma? (4) Were the corpuscles normal red blood corpuscles, or were they in any way distinguishable from those in the general circulation?

To these questions let me address myself.

1. The first condition in the experiments quoted, if it may be called a condition, was that they were both made upon cats. Is the phenomenon confined to cats or is it common to the higher animals generally? By the same methods which were used on the cat experiments have been performed on the dog and on the monkey, as well as many more on the cat. That on the dog produced an even more striking result than those on the cat. On the dog, as on the cat, the shrinkage caused both by hæmorrhage and by exercise was studied, with the following results, so far as hæmorrhage is concerned.

*Successive Bleedings.*

(A) = Total quantity of blood lost by dog.
(B) = Total quantity of blood lost by spleen.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| (A) .. .. | 20 .. | 40 .. | 68 .. | 133 .. | 200 .. | 230 c.cm. |
| (B) .. .. | 5 .. | 25 .. | 39 .. | 44 .. | 50 .. | 52 c.cm. |

The experiments upon the monkey went in the opposite direction, and the method which we used showed only a trifling change in the size of the spleen. These experiments also revealed a weakness in the experimental method. The spleen of the monkey is—or perhaps I should say the spleens of our two monkeys were—roughly, quadrilateral pyramids, each face of which was an equilateral triangle. We put metal clips at three of the four angles, the fourth being the hilus, and proceeded to take X ray photos of the spleen when the animal had recovered from the operation. We then judged the size of the spleen from the position of the clips. Now it is clear that the spleen might expand in such a way as to turn the tetrahedron into a sphere without changing the positions of the clips. Such a change would increase the volume of the spleen about eight-fold.

These considerations indicate a weakness in the method which we employed. Partly on that account and partly because of the desire actually to see and not merely to deduce the effects which one describes, it seemed desirable to supplement the radiographic method of mensuration with a technique by which the spleen actually became visible. Mr. J. G. Stephens and I therefore have carried out a series of experiments in which the spleen was observed through a celluloid window. The first occasion on which we made any observations was on a cat in whose side a window had been placed by Dr. Florey and Mr. Stephens for another purpose. After a few preliminary experiments we decided so to perform the operation that the spleen was withdrawn from the abdomen. We therefore cut away as much of the skin and superior oblique muscle as was necessary for the window and made a slit in the inferior oblique and the parts of the body wall underneath it. Then we drew the spleen through the slit, sewed the cut edges of the inferior oblique loosely together underneath the spleen, so that the organ could not get back into the abdomen, and then put in the window. The wound healed up, enclosing the abdomen. Such an animal might probably be kept alive indefinitely, but we have not allowed any to live more than a fortnight. The spleen soon became obscure owing to the formation of a fibrous covering over it. In the latest experiments we have made a window which will open and allow of the spleen being cleaned.

With such a preparation it is easy not only to delineate the boundaries of the spleen, but to judge of the degree to which it is inflated, and in this latter respect it has yielded instructive results. The spleen of the dead cat is an organ the surfaces of which are, broadly speaking, flat, but in detail rough, and the edges of which are notched. The surfaces of the spleen in the resting live cat is quite different in appearance. The organ resembles a somewhat compressed sausage, being more or less elliptical instead of triangular in section. The surface is quite smooth.

These experiments gave confirmation to the series which we carried out by the X ray technique on the contraction of the spleen during exercise and hæmorrhage and death.

Fig. 1 shows the relative size of the resting spleen with that of the same organ after the cat had taken a trifling amount of exercise in a treadmill. The spleen apparently shrank to about two-thirds its superficial area, which would mean about one-half its volume. Moreover, the even sausage-shape contour is replaced by a much more angular one.

Fig. 2 shows a comparison between the living and the dead spleen. The white portion represents a piece of paper whose area is that of the spleen as marked

[1] THE LANCET, 1925, i., 319.
[2] The Spleen. By H. Gray, F.R.S. London. 1854. Pp. 341.

off on the celluloid window when the cat was at rest; after death (by bleeding) the actual spleen was taken out and photographed on the white paper. In this case the volume of the dead spleen is about one-third that of the living organ when the animal was at rest.

*Study of the Blood which leaves the Spleen.*

2. In order to acquire a knowledge of the nature of the material which leaves the spleen researchers have for many years studied the composition of the blood in the splenic vein. They have obtained variable and, for the most part, negative results, finding little or no difference between the blood in the splenic vein and that in the general circulation. Looking back on such researches in the light of present knowledge they appear to be little short of tragic. Almost as well might one judge of the native Egyptian, or better, the temporary resident in Cairo, by making a careful study of the passenger on the mail steamers leaving the Suez Canal. These passengers come from almost everywhere but Egypt. Since an animal can breathe carbon monoxide for two hours without any of that gas appearing in the hæmoglobin of the spleen pulp, it follows that the blood which emerges from the splenic vein during all that time is short-circuited in some way and that it comes through a by-pass of some kind.

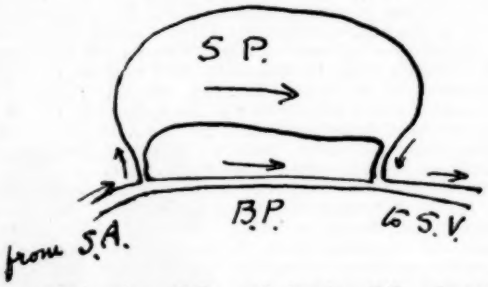
FIG. 1.

Rest. Exercise.

The physiological facts could be explained if the blood could choose alternative routes through the spleen, such as indicated by the following scheme. Precisely how such a representation, which is purely a sort of shorthand intended to represent the functional possibilities of travel, fits in with the anatomical details I am not prepared to discuss.

To obtain the blood from the spleen pulp in as pure a state as possible it is necessary to clamp the splenic artery (S.A.), then to stimulate the splenic nerve which

FIG. 3.



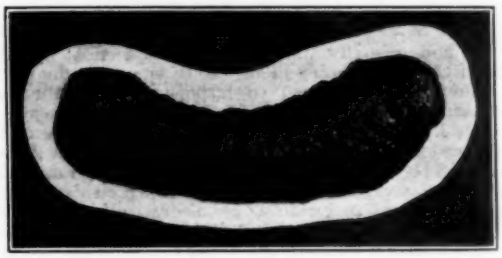

S.A. = splenic artery; S.V. = splenic vein; B.P. = by-pass; S.P. = spleen pulp. (The above is purely schematic and makes no assumption about the nature of the wall which encloses the spleen pulp.)

will cause the blood to be expelled from the spleen pulp (S.P.) along the splenic vein (S.V.). When the splenic nerve is stimulated its action is found to be a very slow one, some eight minutes being necessary in the cat for the expulsion of as much material as will come. It does not come, however, at a uniform rate. In all as much as 13 c.cm. of material have been expelled from a spleen which at the end weighed about 6 g.

*Increased Erythrocyte Count and Hæmoglobin Value of Blood Leaving Spleen.*

3. When the material emerging from the spleen pulp under such conditions is examined it clearly differs very much from the blood of the general circulation. The most apparent difference is to be found in the relative number of erythrocytes found as compared with that in the general circulation. If the spleen blood be collected [3] in successive samples, each of 1 c.cm., and these examined separately, it is found that the corpuscle count varies from cubic centimetre to cubic centimetre and reaching a maximum in the second or third cubic centimetre expelled. The same is true of the hæmoglobin value, which has been studied more particularly. At its maximum the

FIG. 2.



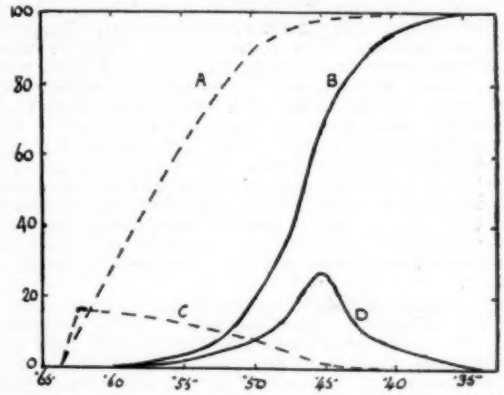
Shows a comparison between the living and dead spleen of a cat.

hæmoglobin value would appear to be about 140 per cent. of that in the general circulation and on the average about 115 per cent. It will be seen that 13·6 c.cm. of material squeezed from the spleen pulp would correspond to approximately 15·6 c.cm. of blood.

*Increased Fragility of Corpuscles in Blood leaving Spleen.*

4. We now pass to the question, Are the corpuscles in the material expelled from the spleen pulp the same as those in the general circulation. Histological

FIG. 4.




A = Per cent. corpuscles from spleen pulp laked } Against strength of salt solution
B = " " general circulation }
C = " " spleen pulp } Against increments of 0·05 per cent. salt solution.
D = " " general circulation }

examination does not reveal any difference. No immature forms have been observed. Fragility tests, however, carried out by Orahovats [4] revealed some intensely interesting facts.

Fig. 4, curves A and B respectively, show the fragility of the blood from the spleen pulp and the

[3] Cruickshank: Communicated to Physiological Society, December, 1925. See forthcoming number of Journal of Physiology.

[4] Communicated to Physiological Society, December, 1925. See forthcoming number of Journal of Physiology.

general circulation in a certain experiment. I should like to make it clear that this was the one which gave the most marked difference. Six consecutive experiments, however, all gave the same type of result. On the average the difference was about two-thirds that shown in the experiment here quoted, and it was about one-quarter to one-third that of the above in the experiment which gave the least conspicuous difference. In all cases, therefore, the difference was quite well marked. We were led to go into the question of fragility by a perusal of the work of Pearce, Krumbhaar, and Frazier on the spleen. Orahovats confirmed their principal results upon the effect of splenectomy on fragility. We would commend to the reader Dr. Krumbhaar's paper in the current number of *Physiological Reviews*.

It had already been shown that not all the corpuscles in ordinary blood are of the same degree of fragility when exposed to hypotonic salt solutions. Brinkman [5] has classified them into three categories, which I shall call Class I., Class II., and Class III. The majority, Class II., the fragility of which differs but slightly from the fragility of the average and two smaller classes, I. and III., each of which contains a relatively small proportion of the corpuscles, but which covers a considerable range of fragility, I. being less fragile and III. more fragile than the average. Fig. 4, curve B, shows the percentage of corpuscles taken plotted against the strength of the salt solution and a glance at it will show the corpuscles of which Bruckmann's three classes are composed. On the particular blood shown Class I. would correspond approximately to corpuscles unlaked by 0·42 per cent. salt solution and would be about 10 per cent. of the whole, Class III. to corpuscles laked by salt solutions of greater strength than 0·52 per cent., and would also correspond to about 10 per cent. The remaining 80 per cent. would be in Class II.

It does not seem that Brinkman's classification amounts to more than that the fragility of the corpuscles has the sort of dispersion relative to the tonicity of the salt solution required to produce laking that most similar phenomena possess (see curve D); nevertheless, as Brinkman's classification is convenient we will retain it. The result of Orahovat's sex experiments in Brinkmann's language was as follows. The corpuscles in Class I. were uniformly more fragile in blood from the spleen pulp than from the general circulation. Similarly the corpuscles in Class B from the spleen pulp were uniformly more fragile than the same class in the circulating blood, whilst Class C did not exist in the blood from the spleen pulp. The impression given is that there is a limiting degree of fragility which cannot be exceeded, from whichever source the blood comes, but that whereas the corpuscles from the spleen pulp are very near that limit the majority of those from the general circulation enjoy a considerable margin of safety.

If instead of using hypotonic salt solution as a hæmolytic agent we have recourse to saponin we find that the corpuscles from the spleen pulp lake less easily than those from the general circulation. The phenomenon of corpuscles, which are abnormally fragile to hypotonic solutions and abnormally strong —if that is the opposite of fragile—to saponin, is no new one. It has been the subject of investigation by Rywosch,[6] who attributes it to insufficiency of phosphorous within the corpuscles. Here, then, appears to be a definite phenomenon, not only is the fluid in the spleen pulp somewhat richer in corpuscles than that in the general circulation, but the corpuscles are, on the whole, different, and this difference appears to be associated with a definite chemical deficiency.

It is too early to make any statement as to the physiological importance of the difference—i.e., as whether it is of advantage to the body that corpuscles of a certain character should be stored outside the general circulation and retained there in reserve. Corpuscles with these particular properties are reputed to be the oldest, but the demonstration does not appear to be convincing, and we are inquiring further as to whether it is the fact.

[5] Brinkman: Arch. Neerland. d. Phys., 1921, vi.
[6] Rywosch: Pflüger's Archiv, 1907, cxvi., 229.

*Explanations of Increased Fragility.*

Some observations may, however, be made on the mechanism by which the spleen acquires this accession of corpuscles of Class III. At first sight two obvious explanations present themselves: (1) The first is that the fragility (to hypotonic solutions and the word will be used in this sense in the remainder of the lecture) of the corpuscles is increased during their residence in the spleen pulp. (2) The second is that the corpuscles which on the whole are the most fragile are caught in the spleen pulp, which would therefore act as a sort of differential filter.

The first of these views seems, in the form in which it is stated, to run counter to the testimony both of theory and experiment. From the theoretical standpoint one may transcribe the curve given in Fig. 4, B, into the form shown in Fig. 4, D, plotting the percentage of corpuscles laked between consecutive concentrations of 0·05 per cent. salt solution against the actual concentrations. If a uniform reduction in the fragility of each corpuscle took place, by some reagent in the pulp acting upon all, a mere shifting of the curve would take place; and even if one supposed that the reagent acted unequally but in a regular manner, one would get a shifting coupled with a stretching or a general contraction, but neither of these is a true picture of what occurs.

The actual alteration is from Fig. 4, D, to C. This is more nearly what might occur if coupled with the progressive diminution in fragility; all corpuscles more fragile than those laked in 0·64 per cent. salt solution cease to exist. The figure is not unlike one which might be obtained if curve D were stretched out laterally and then the more fragile half of the curve cut off. Such a curve would mean a very large destruction of corpuscles, for if the spleen pulp contained 10 c.cm. of corpuscles the inference would be that 10 c.cm. or something of that order would be destroyed. While therefore this theory is attractive at first, it seems to make too great a demand on the corpuscles.

Let us pass to the second alternative, that the spleen is a filter. Such a curve as C would not be developed from D by the mere process of filtering off all corpuscles of more than a certain degree of fragility, but such a curve as C could be reproduced if one assumed that the prospect of a corpuscle being filtered off increased very rapidly with its fragility. Of course, it is not suggested that mere fragility would make the corpuscles more retentive by the spleen pulp; it is possible that fragility might go hand in hand with some other property, such as want of lability, or stickiness, which would have that effect.

On the experimental side Orahovats made an effort to decide between the rival claims of "increased fragility and bursting" and "differential filtration" along the following lines. It might be supposed that if the corpuscles were rendered more fragile and finally destroyed in the spleen pulp, that the process would extend over some time, and that the longer the corpuscles had resided in the spleen pulp the greater would be their fragility. On the other hand, if the process was one of mere filtration the corpuscles in the spleen pulp would differ as greatly from those in the general circulation at the moment of their arrival as after a long interval of time. Orahovats could not find that the time during which the corpuscles were held in the spleen pulp made any difference to their fragility. The spleen, if emptied by stimulation of the splenic nerve, takes several minutes to dilate and engorge itself once more, but at the end of this time the corpuscles within it are as fragile as they are after some hours' residence there, the spleen having been immobilised by section of the nerve. If, therefore, the corpuscles are reduced in fragility to the point of disintegration by some reagent in the spleen the effect must be completed very rapidly.

*Mechanism of Dilatation of the Spleen.*

The work which has been discussed so far has centred largely about the contraction of the spleen. The subject of dilatation has only just commenced to engage our attention. The mechanism by which extensive dilatation is brought about is rather obscure. It is worth remembering that the spleen with its sinuses appears to be particularly susceptible of distension by the pressure of blood within it. Working against this pressure there are (1) resilience of elastic fibres in the spleen, and (2) the tone of the muscle.

Clearly, in dilatation of the spleen there is, or may be, a nervous factor, and one may inquire from this point of view whether the musculature of the spleen possesses any properties different from those of the musculature of the splenic artery, or whether it may be regarded simply as an expansion of the tunica media of that vessel. One may inquire whether the spleen participates in the same reflexes on the arteries in the viscera. The older works on the subject describe the spleen as contracting on stimulation of the central end of the vagus. Accepting this statement, it seemed desirable to dissect out the bundle which contains the depressor fibres in the cat and stimulate it. If the result was constriction of the spleen it would be clear that the splenic musculature reacted differently from that of the visceral arterioles. Dr. Masuda, who undertook this work, found quite the opposite result—namely, that the spleen dilated on stimulation of the depressor trunk of the cali vagus. Whilst the depressor dilatation of the spleen failed to bring out anything specific about its neuro-muscular mechanism as compared with that of the vessels, it raised some very interesting points. Of these the first for consideration is the appearance of the spleen in a mechanism which seems to be connected with the hydrostatic properties of the blood rather than with its function as an oxygen carrier. The function of the depressor presumably is to relieve the heart. It is wholly reasonable that the spleen should assist in that function by dilating, but the discovery that it does so shows that the nervous influences which govern its contraction are not confined to those which are initiated by want of oxygen in the central nervous system. The precise effect of stimulation of the depressor on the blood flow through the spinal cord is not known, but on general grounds one expects some degree of anoxæmia as a result of the fall in arterial pressure. Yet the spleen, so far from contracting as it does in other instances of anoxæmia in the C.N.S., dilates.

It is possible to confront the body with circumstances calculated simultaneously to reduce the oxygen supply to the central nervous system and increase the burden thrown upon the heart. Such is the injection of a large quantity of normal saline. Will the response be constriction caused by the anæmia of the central nervous system or dilatation occasioned by the accession of a considerable volume of fluid to the circulation and the consequent burden upon the heart? The answer to this question is given in Fig. 5. Areas were obtained by Mr. Stephens and myself by the celluloid window technique; frequent small injections of saline were made, 140 c.cm. being injected over an hour. The figure shows the area of the spleen as projected on the window, and it is only necessary to add that in addition to the evident increase in the surface of window occupied by the spleen, the organ presented a very tense appearance. There is no doubt that its volume was at least doubled.

FIG. 5.

Before injection of saline. After saline.

The experiment which I have just described is one of great interest also because it links the observations which have been made within the last two years with the dilatation of the spleen associated with anæmia; about that we are not yet in a position to speak. It must be reserved for some future occasion.

# Clinical and Laboratory Notes.

## NOTE ON THE TOXICITY OF CARBON TETRACHLORIDE IN THE TREATMENT OF ANKYLOSTOMIASIS.

BY M. KHALIL, M.D. BRUX., PH.D., M.R.C.P. LOND.,
PROFESSOR OF PARASITOLOGY, FACULTY OF MEDICINE, CAIRO.

(*From the Parasitology Section, Public Health Laboratories, Cairo.*)

Carbon tetrachloride has been used on a large scale during the last three years as an anthelmintic in ankylostomiasis. The drug was generally considered as non-toxic, but some observers recorded toxic symptoms developing after its use in a very low percentage of the cases treated. The toxic symptoms varied in severity from transient attacks of dizziness, headache, and nausea to severe symptoms, such as vomiting, convulsions, and even death. Lambert,[1] in a series of 50,000 cases treated in Fiji, recorded three deaths, which he ascribed to impurities in the carbon tetrachloride used. Two other fatal cases were reported by Phelps and Hu.[2]

In Egypt carbon tetrachloride has been used on a large scale since 1923. The drug was supplied by a well-known British firm. In order to avoid any accidents, samples from every consignment of the drug were given to experimental animals in fairly big doses to detect any poisonous effect. The drug was also subjected to chemical analysis. The first consignment proved satisfactory. 20 c.cm. given to a three-kilo monkey by a stomach-tube produced no ill-effects besides a transient diarrhœa. A ten-kilo dog was given as much as 160 c.cm. without developing any serious symptoms. The animal was perfectly normal in three days' time. This consignment of the drug was used in the Government anthelmintic hospitals with gratifying results. A second consignment of the drug from the same firm was tried on animals in the same way. 20 c.cm. were administered to a three-kilo monkey on Dec. 27th, 1923. The animal vomited once after two hours and abstained from taking food. It had no diarrhœa and died the following day. Post-mortem examination revealed the following morbid changes. Petechial hæmorrhage in the stomach wall; the terminal 15 cm. of the ileum were full of blood-stained slimy mucus; the intestinal wall was severely congested, and the contents contained carbon tetrachloride unmixed with the gut contents; other organs were practically normal. Another monkey was given 10 c.cm. of the same sample. It suffered from vomiting and diarrhœa, abstained from taking food, but ultimately recovered.

In view of these results the samples were chemically examined but no foreign ingredients were detected. Two litres of the drug were distilled and the residue of 5 c.cm. were given to a monkey by a stomach-tube, but no untoward symptoms developed. The first portion distilling over had a peculiar smell other than that of carbon tetrachloride and suggesting the presence of carbon bisulphide. 3·5 c.cm. of this were given to a monkey which died within 24 hours. The post-mortem revealed the presence of petechial hæmorrhages in the stomach wall. The last portion of the ileum was severely congested with blood-stained contents. No free carbon tetrachloride was found. Carbon tetrachloride distilling over after a first portion of 10 c.cm. was given to experimental animals, monkeys and dogs, but no bad symptoms appeared.

The question was consequently referred to Dr. H. H. Dale [3] and the British Medical Research Council. Dr. Dale communicated with the suppliers, who undertook to fractionate a large volume of the carbon tetrachloride, commercially known as "pure," and submitted the earliest distilling portion for examination by Dr. Harold King. Dr. King found that the small amount of sulphur present in the original sample was accumulated in this fraction, thus confirming the original observations made in Egypt. He, however, reported that it was all in the form of carbon bisulphide. The suppliers were advised to purify the drug from any traces of sulphur compounds.

Subsequent experiments in Egypt tended to show that the toxicity could not be ascribed to $CS_2$. Carbon bisulphide in varying amounts from 1–5 c.cm. were added to one dose of pure carbon tetrachloride and administered to experimental animals, including monkeys, without any ill-effects. On the other hand, the first fraction of a distillate of sulphur-free carbon tetrachloride proved non-toxic. It is therefore probable that the toxicity of ordinary so-called pure carbon tetrachloride is due to sulphur compounds other than carbon bisulphide, although the presence of the latter may be taken as an indication of the unsuitability of the drug for the treatment of ankylostomiasis. The actual toxic compounds remain to be identified.

Sulphur-free carbon tetrachloride can be used safely in doses of 5 c.cm. for the adult. This dose was found to be the most efficacious in expelling *Ankylostoma duodenale* in Egypt. During 1924 no less than 80,000 patients were treated by that drug at the Government anthelmintic hospitals without any fatalities. During the first nine months of 1925 no less than 56,392 patients were treated with only one fatal case. The patient was an old man of 60 years of age, addicted to the use of opium and alcohol. He suffered from collapse three hours after administration of 5 c.cm. of carbon tetrachloride and died within 24 hours. The post-mortem revealed hæmorrhagic embolic foci in the liver and heart.

*Conclusions.*

(1) Some samples of so-called pure carbon tetrachloride are toxic to experimental animals and probably to man. (2) The toxic impurities are probably sulphur compounds distilling at a lower temperature than carbon tetrachloride (less than 76° C.). (3) The toxicity increases on keeping. (4) The toxic impurities can be got rid of by fractionating the carbon tetrachloride and throwing away the first portion of the distillate (about 1 per cent. of the total quantity). (5) The most effective dose in *Ankylostoma duodenale* infection is 5 c.cm., and this is perfectly safe if the purified drug is used.

The chemical work recorded in this paper was done by Mr. E. Griffiths-Jones, chief chemist of the Public Health Laboratories, to whom I am greatly indebted.

*References.*—1. Lambert, S. M., Carbon Tetrachloride in the Treatment of Hookworm Disease: Observation in 50,000 Cases, Jour. Amer. Med. Assoc., 1923, lxxix., 526–528. 2. Phelps and Hu: Carbon Tetrachloride Poisoning. Ibid., 1924, lxxxii., 1254. 3. Dale, H. H.: The Purity of Carbon Tetrachloride: Brit. Med. Jour., 1924, ii., 160.

## NOTE ON THE OPERATIVE TREATMENT OF CARBUNCLE.

BY ARTHUR EDMUNDS, C.B., M.S. LOND., F.R.C.S. ENG.,
SURGEON TO KING'S COLLEGE HOSPITAL.

APART from scraping out with a sharp spoon, an instrument which I like to use as little as possible, the operative treatment of carbuncle resolves itself into making crucial or other incisions into it, or complete excision of the whole affected area. The following method has, I think, some advantages. In Fig. 1 the suggested incision is shown—namely, a crucial incision marking out four flaps which are dissected up as in Fig. 2. At the same time any necrotic area of the skin is cut away so that the flaps become rather ragged. Having reflected the flaps the whole of the suppurating area is cut away with the knife, and the resulting cavity packed with cyanide gauze wrung out in 1 in 40 carbolic, the flaps being turned outwards (Fig. 3). In this way the whole area is opened up to the maximum extent, but with this advantage, four flaps of skin have been left—a little irregular and ragged perhaps—but capable of being replaced in a few days, leaving the position as shown in Fig. 4. The saving of this skin in no way hinders the drainage, while it accelerates healing very much and diminishes the size of the ultimate scar. It might be expected that these flaps would slough, but as a matter of fact they very rarely do.

*Treatment of Carbuncle: Stages in the Operation.*

FIG. 1.

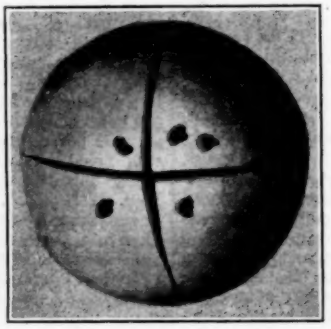


FIG. 2.

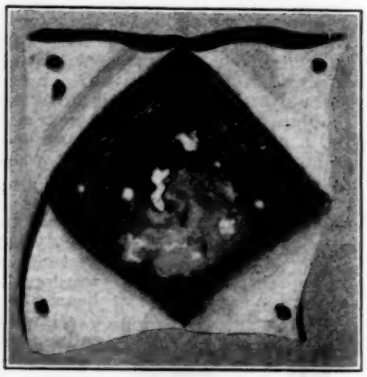


FIG. 3.

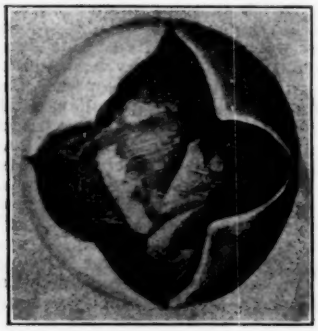
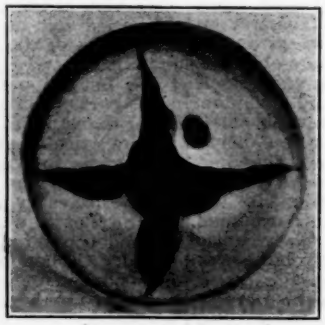


FIG. 4.



# Medical Societies.

## MEDICAL SOCIETY OF LONDON.

AT a meeting of this Society on March 8th, Sir HOLBURT WARING, the President, in the chair, a discussion on

OBSCURE PYREXIA IN ADULTS

was opened by Sir THOMAS HORDER. Departing from the usual methods pursued in arriving at a diagnosis in an obscure case, he set out to construct a series of inquiries to be elaborated under their several headings.

1. The first thought in the mind of the examiner approaching such a case was to enumerate the general causes of a state of pyrexia in a patient who showed few or no physical signs or symptoms. So frequently was pyrexia of microbial origin that some said, when it occurred in the absence of certain experimental drugs, it was always microbial. These would not admit a nervous origin of pyrexia, and acute gout they would probably attribute to microbic toxæmia, perhaps also severe hæmorrhage. There were also other examples of pyrexia which were difficult of explanation on a microbic basis, such as that in active Graves's disease, or that following severe exercise, or that occurring on the ninth or tenth day after the injection of horse serum. At times metabolic defects led to pyrexia quite apart from microbial activity; so in like manner did the injection into the body of foreign proteins. Acute arthritic gout could be accompanied by a pyrexia closely resembling that of septic arthritis. The fever of severe hæmorrhage was important and raised the question whether it was the natural result of a loss of blood, or was the result of an infection to which the loss of blood might have been due. Somewhat akin to this kind was the fever occurring after a period of hæmolysis in Addisonian anæmia. Here the pyrexia might be the direct result of the hæmolysis; it might be an expression of the unknown cause of the disease, presumably microbic, or possibly due to a secondary pyogenic infection. Cases of nervous pyrexia were not satisfactorily dismissed by saying that the pyrexia was always due to some microbial poison in the presence of an unstable thermo-taxic mechanism. If these people were not more poisoned than the generality, the important matter was the neuropathic patient, not the poison, and treatment should be directed to the neurosis and not to a toxæmia. Instability of the thermo-taxic mechanism was also caused by alcohol and by the morphia habit, and an unusually high temperature for which an ordinary explanation could not be found should cause one to think of those drugs. A similar instability of this mechanism was caused by pregnancy and the parturient state, and a long febrile illness left the patient in such a susceptible condition that small and trivial causes would cause the temperature to mount. It would cause the belief among Anglo-Indians returning to this country after having malaria that they had a return of the disease. It was important to take cognisance of the patient's state of health just prior to the onset of the fever. Sometimes the presence of an epidemic in the neighbourhood was a great help in assigning a cause for the temperature, but a suggestion that the case might be one of typhoid or of influenza would perhaps be countered by the doctor with the statement that there was no epidemic of those diseases, and yet the case might be an atypical one of such a disease, and the patient might have acquired it at some other place and developed the symptoms at home. Chronic diseases in the patient were occasionally of much diagnostic importance; he referred to such a condition as nephritis, especially if trauma occurred. An interesting group of cases were those in which surgery had taken place in a septic area, more particularly in connexion with a septic, perhaps a gangrenous, appendix. Here the main question was whether a septic process was still in operation. The right lower quadrant of the pelvis, the subphrenic area, and just above the diaphragm were danger regions. Mastoid operations also might be followed by pyrexia, and in this connexion three questions should be attempted to be solved: (1) Is there still a local septic zone which has not yet sufficiently drained? (2) is it a sinus thrombosis? (3) are the meninges infected?

2. The second consideration was as to whether the cause of the pyrexia was exogenous or endogenous. In most acute pyrexial diseases it was an exogenous infection, but in most subacute and chronic pyrexias the cause was probably endogenous. Sometimes these latter were acute, such as in coliform infection of the urinary tract, in which there might be no focal symptoms or signs for two days. In the past such cases had often been attributed to influenza, but with the present better knowledge of that disease it was hoped the mistake would be less frequent. He believed that the cases of so-called cystitis complicating influenza were not influenza at all, but were a coliform infection of the urinary tract. *Staphylococcus aureus* infections might be very acute and yet endogenous, the patient might have long had a trivial infection of that organism, pustular acne, a boil, or a neglected carbuncle.

3. The third consideration concerned investigation as to the portal of entry. In many cases this was the respiratory tract, and after the first entry of the cause there was little about the portal remaining to incriminate it.

4. The fourth consideration, and one more prolific of results, was the avenue of spread of the infection, or the particular tissue or tract involved. This consideration resolved itself into passing in review systematically the various paths by which infecting agents got into the deeper tissues. The aim should be to prevent the mind becoming discursive; each path should be carefully examined, and one should never be afraid of a large number of negative examinations, because one was well repaid by striking a positive fact, which would not otherwise have emerged. Different microbes affected different tissues, therefore examination of the tissue systems seriatim would often reveal a lesion or functional defect which would suggest the nature of the organism concerned.

5. With regard to the fifth consideration, there were deep-seated organs in which infective processes were apt to get "bedded in" once the infection had become established. Several times he had been led to think the infective agent was staphylococcus—and it proved to be so—by considering such tissue as bone, which was notoriously silent as to signs and symptoms. Attention should be paid to the description of any pain by the patient; it was significant if he did not refer it to a particular spot. In osteomyelitis the pyrexia was of the obscure kind for some weeks. A very important deep organ was the liver; there might be a patch of perihepatitis with an infection of the liver below. And in the perinephric tissues the *S. aureus* might cause pyrexia without symptoms for days, perhaps weeks, but an earlier diagnosis could be made by remembering that it might have started as a blood infection, and that this would cause an intermitting fever. Another "cryptic" region for infection was the subphrenic. And he had been impressed again and again with the latency of pleurisy. Too much importance was usually attached to the pleuritic rub. There might be a long course of pleurisy without physical signs; moreover, the pain of that disease might be referred to the top of the shoulder, the front of the chest, the region of the vertebræ, or over the crest of the ileum.

Twice, said Sir Thomas Horder, he had seen aneurysm associated with obscure pyrexia, and he thought it was pleurisy in association with the aneurysm which led to the pyrexia. Other cryptic areas of trouble causing pyrexia were the sinuses of the nose, and the sphenoidal sinus seemed to be the chief culprit in this region. A further consideration concerned the nature of the organism. Probably the tubercle bacillus headed the list of organisms which caused obscure temperature. Streptococcal infections

had their distinguishing characters; they were liable to occur in bone, perinephric tissues, liver. Also spirochætal infections other than those of syphilis must also be remembered, and an acute fever might be associated with coliform infections.

Still another consideration was the form of the temperature chart; sometimes the help derived from this was so great as to be practically diagnostic. The charts should be studied systematically, and not only four-hourly, but over a long period, for then a character might be revealed which was not evident over the shorter periods. Finally, he referred to clinico-pathological helps in diagnosis. It was useful, he said, to make the clinical investigation of a case as thorough as possible before deciding on the pathological investigation to be pursued. It was not justifiable to have all the latter done, partly for economical reasons from the patient's point of view, but also because they were exhausting to an ill person. And pathological findings could only be properly interpreted in connexion with the clinical side. Diagnoses made in the laboratory were often quite brilliant, but also sometimes to be regretted. Sometimes, in these circumstances, a case was diagnosed as lymphatic leukæmia when it was really a mononucleosis. Clinical facts must always be regarded as positive data.

*Discussion.*

Dr. C. E. LAKIN said that most of the cases of the kind under discussion were either instances of a common disease occurring in a disguised form, or were examples of rare or unusual diseases. His contribution consisted of relating cases in which the causation of the fever caused a good deal of difficulty. One was that of a middle-aged man who, when seen, had been ill four weeks. As it was thought to be typhoid a Widal reaction was done, but on this and other occasions it was negative. The man was indifferent to his surroundings, almost stuporose, and a surgeon suggested he had a frontal abscess. The temperature chart suggested typhoid. As the spleen was palpable a further Widal was done, but again with a negative result. In ten days the patient died, and the post-mortem revealed typical typhoid ulcers; the organisms were obtained from these ulcers and from the gall-bladder. A case of supposed apical pneumonia went from bad to worse and was of a puzzling nature, and post-mortem examination revealed extensive carcinoma of the bronchus on the right side. He narrated other interesting cases, and said he believed a number of cases of obscure pyrexia in the absence of symptoms were due to a small dose of infecting organisms.

Mr. ZACHARY COPE said that a puzzling condition to diagnose was an abscess in the middle of the lung, causing neither pain nor physical signs; he had known such cases diagnosed as neurasthenia. On one patient he was asked to operate for subphrenic abscess, as there was rigidity over one part of the diaphragm, but the leucocyte count was 250,000 per c.mm., and it was found to be a case of splenomedullary leukæmia. Deep sarcoma could also cause a puzzling pyrexia.

Dr. H. A. DES VŒUX quoted an instance in which fever of several weeks' duration was found to be due to nothing more than a tape-worm; the temperature kept at 103° to 104°F. Syphilis was sometimes the cause of an obscure pyrexia, and also tuberculosis in an aged person.

Dr. HERBERT FRENCH discussed the question of blood agglutinations helping to decide whether a particular organism was the cause of the trouble in a case. Also whether blood culture methods had been so perfected as to make them valuable for diagnosis, and whether cultures from the urine enabled one to say what organisms were responsible for a prolonged pyrexia.

Dr. F. G. CHANDLER emphasised the importance of the leucocyte count in diagnosing these obscure conditions; leucocytosis enabled a differentiation to be at once made between subphrenic or perinephric abscess and tuberculosis or typhoid. He quoted cases in point.

Dr. G. W. GOODHART said he did not think there should be such a thing as a laboratory diagnosis.

Dr. W. J. ADIE stated that prolonged fever might be due to encephalitis lethargica; the attack might be so mild as not to arouse the physician's suspicion: but the later development of the Parkinsonian syndrome confirmed its nature.

Mr. J. E. H. ROBERTS, Mr. E. B. WAGGETT, Dr. LENNOX WAINWRIGHT, Dr. PARKES WEBER, and Mr. H. TILLEY also related cases and the ultimate diagnoses.

The PRESIDENT said it would have been of enormous advantage if such a paper as Sir Thomas Horder's had been written and circulated among members of the R.A.M.C. in the early days of the war, remembering the many cases of "P.U.O." He strongly agreed with the opener's suggestion that in cases of obscure pyrexia the clinician should first make a very thorough examination. Many cases of pyrexia remained obscure as to their nature because the physician had not, in the first place, done his work in a proper way. Pathological investigations should follow the clinical in every case. He also agreed with paying attention to everything the patient had to say. In quite a number of cases the cause of pyrexia remained obscure until exploration was made of the gall-bladder region.

Sir THOMAS HORDER replied.

## ROYAL SOCIETY OF MEDICINE.

### COMBINED SECTIONS OF SURGERY, MEDICINE, ELECTRO-THERAPEUTICS, AND THERAPEUTICS.

#### TREATMENT OF EXOPHTHALMIC GOITRE: IODINE THERAPY.

AT a combined meeting of these Sections held on March 3rd, Dr. GEORGE GRAHAM (Therapeutics) in the chair, Prof. E. MELLANBY reminded members that at the discussion of this subject by the Society in 1921 iodine was not even mentioned. This omission was not due to lack of knowledge that iodine had a profound influence on the disease, but was because many recognised that subjects of the disease could be harmed by iodine. But if the capacity of a therapeutic agent to cause harm was to be regarded as a cause for its rejection, the sooner all practitioners became homœopaths the better. Such valuable drugs as mercury, digitalis, ipecacuanha, &c., could do a great deal of harm. The need was to inquire into the conditions in which iodine could produce in the disease baneful effects. In exophthalmic goitre hyperplasia of the gland occurred, and this could easily be induced in dogs. He showed photographs of the thyroid glands of a litter of five dogs, all brought up on ordinary food. The thyroid glands of three were 44 times the size of the others, and the only difference in the diet was that in the case of the dogs with the large glands a little cod-liver oil was given with the food, and to the others was given the same weight of butter (cod-liver oil containing a small quantity of iodine). The small glands were shown to be full of colloid, while in the large ones a condition of real hyperplasia was found. Iodine, therefore, seemed to exercise a profound influence in regulating the size and structure of that gland. The dogs with hyperplasia of the gland had no symptoms of hyperthyroidism. In the latter condition the use of iodine in a few dogs made the heart beat more slowly, sweating was greatly reduced, and the tremors diminished and then disappeared, the state of the patient being changed from one of restlessness and semi-dementia to placidity and almost normality. He showed charts of the pulse-rate and the improvement brought about by giving iodine; the oxygen intake and the basal metabolism were both greatly reduced under the treatment. In one case a basal metabolism which had varied between + 33 and + 48 was brought down to normal on the eighth day by adding 1 gr. of iodine per day to the food. It was at this stage that operation was most favourable,

Unfortunately, after this stage had been reached, the symptoms showed a tendency to reappear, even though the iodine treatment was continued and the food was restricted to 1800 calories per diem. Stoppage of the iodine brought about a real exacerbation of symptoms. However long the iodine was persisted with, there was a return of the unfavourable factors on its cessation. The iodine seemed to keep the intensity of the symptoms in check. In some cases the usual effect just described did not follow the giving of iodine. The first effect might give place to a sudden acute exacerbation of symptoms, the basal metabolism went up, and the patient became much worse. Recovery occurred in a few days, and if the treatment were continued thereafter another exacerbation ensued. The cases in which this occurred were those of toxic adenomata, people who had had large thyroids and who then developed hard, knobby glands. Their acini were very distended and swollen owing to the contained colloid. Sometimes the thyroid got so large that it caused respiratory obstruction, rendering operation imperative, and not at a stage which the surgeon would choose for it.

Among the advantages of iodine therapy were that a rapid disappearance of the symptoms was brought about by giving iodine, and this proved a valuable aid to surgery. The general condition of the patient was also greatly improved. Some cases completely recovered after this treatment; he had tested some over a period of four years. Many said that if cases of exophthalmic goitre were left alone they would recover spontaneously, and some evidence was available to that effect, while at the last discussion on the subject Sir William Hale-White supported the contention by statistics. The disadvantages were that in some cases, particularly in secondary Graves's disease or toxic adenoma, there were certain definite dangers of a sudden exacerbation of symptoms. This was so pronounced that he did not now give such people—with hard, knobby glands—iodine at all. A further disadvantage was that stoppage of the iodine caused an exacerbation of symptoms. Another was the danger of asphyxia due to the colloid-filled gland causing pressure on vital structures. He gave the patients a good diet, but kept the total calories low, as in experimental animals it was found that the greater the quantity of food taken the bigger the gland became. On the whole, he considered iodine therapy was a valuable adjunct in the treatment of exophthalmic goitre.

Dr. J. W. MCNEE said his interest was aroused in this aspect of the subject when Means, of Boston, U.S.A., showed, in 1924, the effects of giving Lugol's iodine in cases which were being prepared for operation on the thyroid gland. Within limitations this revival of the treatment of goitre must be classed as a very great improvement as a safe preparation for operation. From 10 to 12 days after commencing the iodine seemed to be the best time for operation, and it could be gauged chiefly by the pulse-rate, without metabolic determinations. He was sure that such a fall of pulse-rate and general improvement could not be brought about, as some contended, by rest in bed alone. Some improvement followed such rest, but on giving iodine it at once became more marked. By operating at the period of 10 or 12 days the general mortality had been definitely reduced, and surgeons could now operate on the gland with much greater safety and take away a larger part of it than they formerly cared to attempt. Since he took an interest in this subject he had noted the frequency with which symptoms returned after hemi-thyroidectomy had been carried out. In the last few months he had seen four cases—one operated on six years ago, one four years ago, and the others three years ago—in which great exacerbation of symptoms occurred; and all had now been re-operated on under the new conditions and all with complete success. Even when, after ceasing iodine, there was a return of symptoms, these were never so severe as they had been originally.

With regard to the use of iodine in controlling the so-called crises in exophthalmic goitre, he had not seen in this country cases of anything like the severity of some he saw from the Mississippi Valley in America, the eyes of some of the patients lying out on their cheeks, accompanied by double pan-ophthalmitis, and the people being acutely insane. Still, he had seen in England severe cases with great mental disturbance, and the effect of iodine was to produce a profound and rapid improvement, sometimes within a few hours; 15 ♏ of Lugol's iodine produced great benefit in a day or two. The cardiac failure in Graves's disease—often, but not always, associated with auricular fibrillation—he did not agree was successfully treated by iodine, as alleged by Plummer. In one or two severe cases, with great œdema and ascites and effusions into the pleura, even large doses of iodine produced no effect at all. But when digitalis was substituted for the iodine a good effect was at once obtained. He had tried, in the out-patient department, giving iodine alone for a period of six months, but he had not been impressed with the result, and two he had brought into the ward to put them on to iodine treatment there, and they were subsequently operated upon.

With regard to the mechanism of exophthalmic goitre and how iodine was related to it, he was much interested in the work at Rochester in connexion with the possible presence in these thyroid glands of a substance differing from thyroxin. That work had not yet been published, but it seemed one of the likeliest explanations—namely, that in these cases there was a substance allied to thyroxin but differing from it, in which some of the iodine was replaced by some other compound.

Dr. GUSTAV MONOD (Vichy) referred to the case of a woman, aged 45, who was admitted to hospital with a very definite complex of Graves's disease. She was submitted to X rays, but with no result. She then developed glycosuria, and she was given large doses of insulin for this, while retaining the normal diet. As expected, the diabetic symptoms cleared up immediately, and there was also a rapid improvement in all the exophthalmic goitre symptoms. After a few months, however, the patient developed pneumonia and died. He had found that cases of exophthalmic goitre were very tolerant of insulin. He wondered whether, in supplying insulin to the body, one was bringing about the same result as by performing thyroidectomy.

Prof. F. R. FRASER said that at the hospital he was attached to 50 cases of exophthalmic goitre had been treated with iodine in the last five years. At the beginning of that period there was no guidance as to dosage, hence, in a certain number of cases, harm was done. Doses of 30 ♏ of the 10 per cent. solution in alcohol a day were used, increased, in some instances, to 60 ♏, and in one case to 180 ♏ per diem. When harm was done it took two forms. One was the production of symptoms of iodism; the other was to cause a great enlargement and hardening of the thyroid gland and an exacerbation of the tachycardia, the palpitations, and the sense of choking. It was later found that results as good followed the use of smaller doses, and gradually the present scale of dosage was evolved. Mainly they used a 10 per cent. solution of iodine in 95 per cent. alcohol. Still, any ionised form of iodine answered equally well. Some people prescribed tincture of iodine which contained a large proportion of iodine as well as iodide. The particular preparation intended should always be specified. At St. Bartholomew's Hospital patients had been kept in bed and the severity of their symptoms of intoxication, their basal metabolic rates, &c., estimated, and then they were started on 5 ♏ of the alcohol solution three times a day. When the maximum result had been attained, the quantity was reduced to 10 ♏ a day, this being further reduced to 5 ♏ daily before the patient left the hospital, and this was the largest dose on which patients were allowed to leave the institution, otherwise severe exacerbations were liable to occur before they could be checked. He agreed that, however carefully watched, there were cases in which harm was done,

and these were those of secondary Graves's disease. The dose for these had to be cut down to 2 ℥ a day; he believed every case of thyroid intoxication could be benefited if the right dose of iodine for that particular patient was ascertained. He agreed that cases of circulatory failure responded poorly to the treatment. He did not doubt that by means of iodine, carefully adjusted in this way, the disease ran its course at a lower level of intoxication than normally, and that if it was going to recover spontaneously it did so having run the milder course. He was also convinced that the treatment was most valuable in getting patients ready for surgery; also, it was very beneficial given for a long time after operation. He had not seen the severe crises referred to by Dr. McNee, but recently a girl was being given thyroxin intravenously. At first she improved a little, but after some days her pulse rose, she became excited, had tremor, and her level of intoxication rose. She was put on to iodine, and everything came down nicely in two or three days. He concluded by showing a number of charts of cases and relating their clinical histories.

Mr. T. P. DUNHILL said that when a patient was very ill there was always a tendency for the surgeon to hope that he could stop the disease, or for the surgeon to be persuaded by the physician to operate against his better judgment. The operation for exophthalmic goitre should never be one of emergency; the patient should be in a proper condition for operation before such was attempted. After the preliminary iodine treatment already outlined had been given, there was not only less operative risk, but less blood was lost at the operation, and this was all to the patient's benefit after the operation. In the actual carrying out of the operation he found that in the iodised patient one could encroach more without harm on the region of the recurrent laryngeal nerve, and that it did not slip back in the loose cellular tissue. The iodine seemed to have changed the secretory stage to a colloid stage—i.e., the gland had reverted to a resting stage. In exophthalmic goitre there seemed to be produced a molecule, not that of thyroxin, which was poisonous, and hence the body was not receiving that which enabled it to carry on its normal metabolism. When iodine was given it did not stop the secretion of this poisonous substance but made up the iodine deficiency. He suggested that perhaps less of the gland could be removed than had been customary and yet secure as good a result, though he thought these patients never became quite normal again. Operation was nothing more than an expedient, and search for the cause of the condition should still be continued. Plummer did not claim that iodine would do good in every type of case; he said that in two-thirds of the cases the result was striking. In about 5 per cent. of the cases it was harmful. That seemed to be the general experience in this country too. The work of Scott Williamson and of Mellanby showed that there was a marked difference between the primary and the secondary types of goitre. In the primary there was very little fibrosis, in the secondary a great deal. Every grade between the two was met with. He warned Fellows against accepting such statements, as that all cases of exophthalmic goitre were so greatly improved by being given iodine that surgical operations on them became safe, or that the degree of preparation usually given to them had become unnecessary, or that after the operation they could safely leave the nursing home in five or six days.

Dr. J. A. RYLE spoke of the over-zealous attempt to find a specific method of therapy for a disease which was admittedly non-specific. He urged that there should be a more critical attitude adopted towards the problem. Very little was known of the causal pathology of this disease, and he believed that in producing the flare-up of symptoms many factors were at work—perhaps physical, metabolic, and infective. Certainly there was an emotional factor, both in its initiation and its perpetuation, and hence the search for a simple chemical answer should at least be undertaken with care. He did not dispute that iodine had a definite effect on certain cases of exophthalmic goitre, nor that salicylates produced an effect on rheumatic fever. But the pathological course of the latter was not influenced by salicylates. Sir William Hale-White had insisted on the importance of a study of the life-history of a disease when left to itself, and drew attention in the last discussion to the tendency of this disease to natural recovery. Indeed, very good figures resulted from "skilful neglect," and he had never yet felt called upon to ask a surgeon to help him with a case. Summing up his attitude on the subject, he said he preferred to treat a case with optimism rather than with iodine.

Dr. E. G. CALVERT said that in the last three years he had treated 60 cases of exophthalmic goitre with iodine, and he agreed as to its beneficial effects. Coincident with the improved clinical condition of the patient he noted that the gland became firm, and if the iodine was pushed so that the gland became of stony hardness the results were not of the best. The best results ensued from giving from 3 to 7 ℥ of Lugol's iodine. He exhibited photographs of cases and gave the details of the treatment pursued in each case, with the clinical results.

The CHAIRMAN said it had become evident that, though iodine could do much for patients suffering from exophthalmic goitre, it might prove for some, especially if the dosage was not correct, a very dangerous drug. He alluded to the desirability of setting up some standard preparation with a known iodine content. He also referred to the value of large doses of iodine for acute tonsillitis with auricular fibrillation in association with exophthalmic goitre, and related a case in point.

*(To be continued.)*

## ROYAL MEDICO-PSYCHOLOGICAL ASSOCIATION.

A MEETING of this Association was held in London on Feb. 16th, Sir FREDERICK MOTT, the President, being in the chair. After resolutions of condolence with the families of the late Dr. Henry Rayner and the late Dr. W. D. Moore had been passed, Dr. ISABEL ROBERTSON read a paper on

*Blood and Vascular Conditions in Psychoses.*

She recapitulated certain observations on the hæmoclastic crisis in psychoses, and submitted the results of further work on the effect of hyoscine and adrenalin on the production of that crisis in encephalitis lethargica. The reaction, she contended, was real and was not related to such factors as normal variations in the leucocytes, and was able to show that reversals of reaction occurred under the influence of sympathetico- and para-sympathetico-ministic drugs. The crisis was characterised by leucopenia, fall of blood pressure, inversion of the leucocytic formula, hypercoagulability of the blood, and diminution of the refractive index of the serum. To demonstrate its presence 200 g. of milk was administered to a subject who had fasted since the previous night. The leucocytes, differential leucocytes, and blood pressure were noted before the taking of the milk, and at intervals of 20, 40, and 60 minutes after it. The maximum disturbance was generally at the 40-minute interval. In 50 well-marked cases of dementia præcox of all types and at all ages 94 per cent. reacted to the ingestion of milk by a definite hæmoclastic crisis. In 70 per cent. of these the leucopenia was accompanied by a fall in blood pressure of from 3 to 12 mm. of mercury. In cases of melancholia, acute and chronic, 75 per cent. definitely gave the crisis, 15 per cent. a normal leucocytosis, and 10 per cent. an indeterminate result; 55 per cent. of the mania cases examined showed the hæmoclastic crisis, 20 per cent. gave a normal leucocytosis, and 20 per cent. an indeterminate result. Commenting on a paper by Dr. A. F. B. Shaw,[1]

[1] Brit. Med. Jour., 1925, i., 914.

in which the crisis was discussed as a test for liver function with special reference to leucocytic changes, Dr. Robertson said that Dr. Shaw's paradoxical results were similar to those she obtained and termed intermediate. She found that the general effect of heat in normal subjects was to cause a leucocytosis, but if the heat were intense there was a leucopenia. Similarly, ordinary cold caused leucopenia, but prolonged cold caused leucocytosis. The leucocyte count could be affected by psychic and emotional disturbance, and the variations might be both rapid and intense. With care and proper technique, however, it was possible to obtain leucocytic equilibrium within an hour.

Investigations had been made in 275 early psychotic cases ranging from the milder neuroses to the more acute forms of mental trouble; 49 per cent. showed the hæmoclastic crisis, 12·5 per cent. gave an intermediate reaction, and 38·5 per cent. reacted normally by a leucocytosis; 50 per cent. of the intermediate ones showed the hæmoclastic crisis later. There seemed to be some prognostic value in the presence or absence of the crisis in these cases. Investigations on the ingestion of milk following the administration of adrenalin, atropine, and pilocarpine showed that adrenalin and atropine could convert the leucopenia into a leucocytosis, though neither had any influence on the leucocytosis occurring in the normal subject. The effects of pilocarpine were too varied to permit of a statement being made. Administration of thyroid caused a reversal of the reaction; it produced the crisis in a normal subject.

*Hæmoclasia and Encephalitis Lethargica.*

Dr. Robertson said that 13 of 15 cases of encephalitis lethargica reacted to ingestion of milk by a definite leucopenia, the other two by a leucocytosis. The effect of the subcutaneous injection of hyoscine on the encephalitic cases was a leucopenia in all except one. In the cases of chorea the drug caused a marked leucocytosis in four, a slight leucocytosis in one, and a leucopenia in one. Thus the tendency was for the effect of hyoscine to resemble the response to milk, though this did not hold absolutely.

In the investigation of anaphylaxis it was established that certain phenomena occurred at the time of, or just before, the onset of anaphylactic symptoms. The most important were a fall in the leucocyte count, a drop in the arterial blood pressure, hypercoagulability of the blood, and a diminution of the refractive index of the serum. This crisis was demonstrable in asthma, paroxysmal hæmoglobinuria, epilepsy, and other conditions. Anaphylactic shock, Dr. Robertson said, was not due to a specific poison, but could appear as a result of a physical process. Schiff had shown that a marked eosinophilia occurred in the blood during anaphylactic shock. There seemed to be a similarity between hæmoclasia and anaphylaxis. Gluser had found that after an active dose of adrenalin or atropine the leucopenia following the ingestion of milk could be converted into a leucocytosis, and that in a normal person pilocarpine converted the leucocytosis into a leucopenia, his conclusion from this being that the hæmoclastic crisis was a change in the equilibrium between vagus and sympathetic tonus. Hæmoclasia occurred after glucose in practically every case of diabetes, but after the ingestion of milk in less than 50 per cent. In her summary Dr. Robertson said that hæmoclasia occurred in 94 per cent. of cases of dementia præcox, 85 per cent. of melancholias, 75 per cent. of manias, and 88 per cent. of encephalitis. The blood changes were in the venous blood as well as in the blood at the periphery. She suggested that a condition of anaphylaxis existed in cases showing hæmoclasia, and that this condition depended on the condition of the sympathetic nervous system.

*Discussion.*

Dr. F. L. GOLLA agreed that the reaction was one that could be obtained with unfailing accuracy when certain precautions were observed. But those who hoped to discover by this reaction some form of mental or nervous disease were doomed to disappointment. It was a simple phenomenon, uncomplicated by the ingestion or absorption of foreign proteins. In one case Dr. Robertson had found that it varied according to whether the patient was standing up or lying down, and reversals could be obtained by administering adrenalin or thyroid extract. The bronchi and the musculature of the lungs were also involved in the reaction; if the bronchi were contracted, as in asthma, there was one reaction; if they were dilated, there was a reversal of that reaction, and the same was true of the sympathetic nervous system elsewhere. A minute dose of adrenalin caused relaxation; a larger dose was followed by constriction. The reactions depended on the state of the receptive organ. The reaction was not diagnostic, but it showed that an organ was in a certain state of either equilibrium or dysequilibrium. It also seemed that it would be of value in prognosis. At the bottom of nervous conditions there seemed to be a maldisposition of the vegetative nervous system.

Dr. A. A. W. PETRIE said that in his experience a high proportion of anxiety cases gave a positive reaction, perhaps largely because they returned to hospital after a trying time at home. A very high proportion of cases of dementia præcox gave the reaction. He agreed that the test promised to be of great assistance in prognosis; it might show with fair truth what cases were likely to pass into the certifiable stage.

The PRESIDENT said that this was a very important piece of work in showing the dysequilibrium of the vegetative nervous system which was common to all cases of psychosis. Owing to a change in the hydrogen-ion content of the blood, he thought the surface tension of the fluid might be altered, so that the leucocytes adhered more to the sides of the vessels.

## NORTH OF ENGLAND OBSTETRICAL AND GYNÆCOLOGICAL SOCIETY.

AT a meeting of this Society held in Sheffield on Feb. 19th, Mr. W. GOUGH (Leeds), the President, occupied the chair, and Mr. A. LEYLAND ROBINSON (Liverpool) showed an

*Ovarian Cyst*

removed from a healthy, well-developed girl of 11 years.

She complained of abdominal discomfort for one week, and on examination her doctor discovered a tumour extending up to the umbilicus, which had all the physical signs of a simple serous cyst. A vaginal examination made under anæsthesia immediately before operation disclosed typical dermoid consistency of the lower pole of the swelling, and suggested the dual pathological nature of the tumour. Removal was easy, and convalescence uneventful. It was noticed at the operation that the uterus was narrow and elongated, probably as a result of pressure from the tumour, and perhaps of hypofunction of the ovary. The external genitalia were normal.

The specimen proved to be a bilocular cyst, the lower loculus showing the usual characters of a dermoid, and the upper one those of a serous cyst adenoma.

These cases, said Mr. Robinson, were not very uncommon in children under 10 years of age. Bland-Sutton had collected 100 cases, and Howard Kelly had published 126 in 1901, of which 55 were unilocular or multilocular cyst adenomata, 47 were dermoids, and 24 were solid tumours of the ovary. Many tumours had been successfully removed from quite young infants. D'Arcy Power had operated on a child of 4 months, and MacGilliray in 1908 had described a very interesting operation at which he successfully removed a cyst which completely filled the abdomen of an infant of 11 months. The chief points of interest in the present case were the association of a dermoid cyst with a serous adenoma, the almost complete absence of symptoms, which were generally those of an acute abdomen and due to torsion, and the attenuated appearance of the uterus. Possibly there would be persistent infantilism

as a result of the loss of the left ovary, which might offer an excellent opportunity for the use of glandular extracts during pubescence.

*Tumours of the Vulva.*

Mr. Robinson also reported two cases of tumours of the vulva which were sent to hospital with a diagnosis of Bartholin's cyst. The first, in a single multiparous woman of 33 years, proved to be a fibromyoma of the vulva; it would be called a dermoid by some pathologists. These dermoids were described as connective-tissue tumours of the female abdominal wall, which display active growth during pregnancy and have a pathological relationship to the fibrosarcomata. The probability was that they were merely fibromyomata arising in the round ligaments, or some outlying or displaced rest of myometrial tissue, which grew in unison with the uterine muscle during pregnancy. The cellular appearance produced by this decidual or pregnancy reaction had been mistaken for malignancy, and had led to the incorrect inclusion of these tumours amongst the sarcomata. The second tumour was a carcinoma of Bartholin's gland.

The patient was a widow of 55 years of age, 17 years past the menopause, with no history of gonorrhœa or any serious illness. There had been four abortions, the last 20 years ago, and no full-term labours. The patient complained of some dragging pain in the vagina and of a lump in the vulva which was first noticed four months before seeking advice. It had been getting bigger lately.

A swelling the size of a hazel nut was found in the right labium majus, in the anatomical position of Bartholin's gland. It was slightly tender and solid in consistency. The overlying skin was perfectly normal in appearance and mobility. No glands could be felt in either groin. Local excision only was done, partly because the patient's general condition was very poor and partly because the diagnosis of malignancy rested on suspicion alone. There were no enlarged glands, and it was thought that as this type of malignant disease is very rare, the lump might turn out to be a simple adenoma.

A small secondary hæmorrhage occurred on the ninth day of convalescence, but otherwise the patient made a smooth recovery, and remains well at the present day, seven months later, during which time she has been under treatment by X ray therapy.

In 1913, said Mr. Robinson, Dr. Herbert Spencer had published a similar case, and had included in his paper 13 which he had been able to collect from the literature, of which only one had been published in English journals. Spencer stated that these tumours are harder than an inflamed gland, nodular on the surface, and associated with bluish discoloration of the skin and œdema of the hymen; but 14 cases were too few to dogmatise on, and practically none of these points were seen in his, Mr. Robinson's, case. Of the 14 examples collected by Spencer, in one only had there been any positive history of gonorrhœa, and in only three was leucorrhœal discharge a feature; so that previous infection had little, if any, ætiological significance. Congenital abnormality had been noticed in two cases, Bartholin's gland being apparently absent on the side opposite to the tumour. The pathological appearances varied greatly, and little agreement existed amongst the 14 authors. In three cases the growth was described as carcinoma only, in two as cylindrical carcinoma, and in the remainder as follows: Melano-carcinoma; tubular carcinoma, partly scirrhus; carcinoma parvi cellulaire; cancroise carcinoma; adeno-carcinoma; villous carcinoma; squamous-celled carcinoma; and adeno-carcinoma, resembling squamous. Spencer pointed out that the pathological differences were associated with the fact that the epithelium lying around the acini and ducts varied considerably in shape and arrangement, and hence the gland might well give rise to tumours of diverse appearances. He quoted Jambon and Chaboux, who had examined the glands of several young adults after death. They stated

"that the excretory ducts appear in the middle of the gland in the form of irregular cavities, reaching even to the middle of the acini. They present an epithelium either of one or several layers of cubical cells. Generally, as the duct increases in calibre and importance, its epithelial lining becomes thicker. The cells are only half the size of the secretory cells of the acini, and consist of a large nucleus surrounded by a thin layer of granular protoplasm; near the termination of the common duct the superficial layers of the lining epithelium tend to become squamous."

These authors say nothing about distinctly cylindrical epithelium in the duct, though this is mentioned by de Sinety, Klein, and Langerhans. In the present case there could be no doubt that the tumour was an adeno-carcinoma. These growths were said to be of great malignancy, and of the 14 cases mentioned by Spencer only one survived six years after operation. "It is interesting to note," said Mr. Robinson, "that in this case, as in my own, no glands were removed. I hope to report the progress of the case to the Society at some later date."

*Chronic Inversion of the Uterus.*

Dr. D. DOUGAL (Manchester) reported the following case.

Mrs. H., married, aged 24, complained of constant bleeding which began six weeks after confinement 14 months previously. At the confinement the child was born without interference, but the placenta had to be removed manually. She states that she was much shocked at the end of the labour, and her convalescence was slow. She was extremely anæmic, and on vaginal examination a soft swelling was felt protruding through the cervix. This tumour bled a good deal on being handled. The fundus of the uterus could not be felt in its normal position, and chronic inversion was diagnosed.

Attempts to reduce the displacement with repositors, both Aveling's and another, were unsuccessful, and it was decided to use surgical means. Spinelli's operation was chosen. This is really an extensive anterior hysterotomy, but in this case it was somewhat awkward to carry out owing to the inverted structures. The anterior wall of the uterus had to be incised as high as the fundus before it was possible to reduce the displacement. There were no adhesions present at the neck of the sac, but the peritoneal surfaces about the fundus were adherent to one another; the remains of a partially atrophied fibroid, about the size of a bean, were found on separating the adhesions. This tumour was excised, and the uterus stitched up. There was a good deal of oozing which could not be completely controlled, and so a narrow gauze drain was left in contact with the anterior uterine wall. The vaginal wall was then sutured in the usual way, a small part being left open for the gauze to pass through.

The patient made an uneventful recovery, and is now, three months later, menstruating regularly and losing a normal amount of blood at the periods.

The inversion, Dr. Dougal said, might have been caused by extracting a partially separated placenta; but, on the other hand, it might have been spontaneous, the fibroid tumour at the fundus of the uterus playing some part in the process. The failure to replace the uterus with the repositor had no doubt been partly due to the fact that the anterior and posterior surfaces of the uterus were adherent in the neighbourhood of the fundus.

*Ruptured Uterus.*

Dr. C. P. BRENTNALL (Manchester) reported a case of ruptured uterus in a woman, aged 38 years, in her sixth pregnancy.

The first four labours were normal and at full term; the fifth was premature, and the child was stillborn. There was a minor degree of pelvic contraction; the transverse measurements were normal, and the conjugate slightly reduced. The external conjugate measured less than 7 inches. There were no abnormalities during pregnancy, and labour began about the estimated date. Pains began at 8 A.M., and continued until about 5.30 P.M. They do not appear to have been severe; there were long intervals between them, and the woman was still going about the house when her husband returned from work at 5.30. Shortly afterwards the membranes ruptured, the uterine contractions recommenced, and she took to her bed. She says that she bled a good deal during the evening, but this is doubtful as the midwife did not send for a doctor until about midnight. The pains continued without intermission until 2.30 in the morning. She was seen by two doctors about midnight, and was immediately sent to hospital with the diagnosis of impacted breech. There appears to have been no attempt at any operation.

She arrived at hospital at 2.30 A.M. Labour had then lasted 18½ hours, and the membranes had been ruptured

nine hours. She was very pale and shocked. Abdominal examination revealed the obvious fact that the uterus was ruptured. The body of the fœtus could be felt to one side and the contracted uterus to the other. The lower abdomen was very tender, and she complained of pain in the left shoulder. The fœtal head was quite low down in the pelvis, lying in the transverse diameter, and there was a depressed fracture of the posterior parietal bone. The fœtus was delivered by craniotomy, and the placenta removed manually. It seemed doubtful whether the woman would stand an abdominal section, but it appeared to be her only chance. When the abdomen was opened a longitudinal tear of the uterus was discovered, extending from the attachment of the round ligament, and involving the upper part of the vagina. Both layers of the broad ligament were torn across, but the Fallopian tube and infundibulo-pelvic ligament were intact. The uterus was removed as rapidly as possible by panhysterectomy, and the vaginal wound closed. The pelvis was drained by a rubber tube in the lower angle of the incision.

Dr. BRENTNALL remarked that there were one or two unusual features about the case. Ruptures of the uterus were, of course, of more frequent occurrence in the minor than in the major degrees of contracted pelvis, and they were commoner in multiparæ than in primigravidæ. But in such cases there was generally a history of dystocia, and the supposition was that some undetected injury to the soft parts gave way at the subsequent labour. In this case the pelvic contraction was of a very minor degree, the pelvis being of the simple flat variety; and all the previous confinements had been completed without difficulty or undue delay. There was no early rupture of the membranes, and if it was assumed that the second stage of labour began when the waters broke, its total duration had been not more than nine hours. The most unusual feature of the case appeared to be that the head had passed the brim and was well down in the pelvis.

Amongst other contributions to the meeting was a note on two cases of Wertheim's hysterectomy complicated by double ureter, by Prof. W. FLETCHER SHAW (Manchester).—The PRESIDENT showed a specimen of carcinoma of the cervix from a patient aged 29, and Prof. SHAW reported having seen the condition in a woman of 22.—Prof. J. S. C. DOUGLAS and Mr. W. W. KING (Sheffield) demonstrated a specimen of mucocele of the appendix.—Mr. KING described a case of adenomyoma of the uterus, and Dr. DOUGAL gave an account of a case of double placenta in which there was placenta prævia, and marginal and velamentous insertion of the cord.

## ROYAL ACADEMY OF MEDICINE IN IRELAND.

### SECTION OF SURGERY.

AT a meeting of this Section held on Feb. 19th, Mr. R. C. B. MAUNSELL, the President, took the chair, and Mr. W. E. MILES (London) read a paper on

*Carcinoma of the Rectum.*

He said that he had treated 587 patients for this condition, in 211 of whom the disease had come on between the ages of 50 and 60; the incidence had been almost equal in men and women. There was only one type of cancer of the rectum—an adeno-carcinoma. But there were three varieties of carcinoma which were recognised clinically and which differed in malignancy—the papilliferous type, the adenoid type, and the colloid degenerative type. In the first, which was the least malignant kind, involvement of the glands was seldom found; even after a restricted operation the growth was not apt to recur. This type was not as common as the others. The adenoid type was much more malignant. There were always infiltrations, and only an operation which aimed at removing the vulnerable tissues would protect a patient against recurrence. The colloid type affected the connective tissues. It was the most malignant type of cancer, and practically always recurred, even after the most drastic operation. These three varieties of carcinoma might be met with in any part of the rectum.

Referring to symptoms, Mr. Miles said that if attacks of alternating constipation and diarrhœa were waited for, a case might be missed which would otherwise be amenable to treatment, for sometimes these attacks did not occur until the disease was very far advanced. The position of the cancer made a difference to the rapidity with which they developed. There might, however, be actual difficulty in obtaining an action of the bowels at all, and this was an urgent symptom. Ampullary growths might persist for a considerable time before they produced enough symptoms for notice. If the liver was involved in a case of cancer of the rectum it might be taken for granted that the growth had penetrated the peritoneum, and that operation was now contra-indicated. It was impossible to say how long these growths might exist without producing any symptoms, but certainly they might be present for six months before any symptoms showed themselves. The extent of the circumferential involvement was an index of the depth of the growth and of the length of time the disease had been present. The operability or inoperability of a case could not be estimated by digital examination alone, and it was absolutely necessary to open the abdomen and see what the condition of extramural extension was. The dissemination of cancer from the extramural lymphatics was slight.

The PRESIDENT drew attention to the lack of symptoms in rectal cancer, except when the growth was low down near the anal canal, when the pain was very severe.

Sir WILLIAM TAYLOR said that there was only one scientific method of dealing with the condition, and that was the combined abdominal and perineal operation. It was undesirable, he agreed, to estimate the operability by digital examination alone; secondary deposits in the liver could sometimes only be detected by laparotomy and examination of the upper surface of the viscus. Carcinoma of the rectum seemed relatively uncommon in Irish practice, but in his comparatively limited experience only one case in six was operable. At the Mayo Clinic recently he had seen six cases operated on within two days by the parasacral method after preliminary colostomy. The mortality rate for this procedure was, he believed, about 5 per cent.; but the operation now done at the Mayo Clinic was the combined abdominal and perineal one.

Mr. SETON PRINGLE said that there was only one really radical operation for carcinoma of the rectum, and that was the combined abdominal and perineal operation. The immediate mortality might be high, but the cases which got over the operation had a reasonable chance of permanent recovery.

Mr. H. F. MACAULEY said that he thought the vast majority of cases of carcinoma of the rectum seen in Dublin were inoperable. Frequently he found nodules in the liver, and could not go on to further operation.

Mr. H. S. MEADE said that in the last ten years he had seen 46 cases of carinoma of the rectum, of which 26 were inoperable. Eleven of these, though operable, had refused operation because colostomy had been done. Of the other inoperable cases two survived and were getting deep X ray treatment. He had operated on 20 cases. In the first eight he had done the perineal operation, and all of them were dead except one. In the remaining 12 he had used the combined abdominal and perineal method; seven had died but the other five were still alive.

Mr. MILES, replying, said that even in early cases only the biggest possible operation gave the possibility of safeguarding against recurrence. In obstructive cases he always performed cæcostomy.

### SECTION OF PATHOLOGY.

AT a meeting of this Section held on Feb. 12th, Prof. J. W. BIGGER, the President, read a communication on the Tests for Yeasts used in Baking. The production of baking yeast, he said, was now almost a separate industry from that of yeast for brewing

He discussed the qualities desirable in baking yeast and the tests for estimating them.

Mr. R. A. STONEY and Dr. J. T. WIGHAM showed a specimen of sarcoma of the testis from a man, aged 30, with a previous history of phthisis. The earliest sign had been a swelling of the epididymis, which was clinically indistinguishable from a tuberculous epididymitis.—Dr. W. BOXWELL showed specimens of sarcoma in lungs and brain, secondary to a round-celled sarcoma of the testis removed nine months previously.—Dr. W. D. O'KELLY showed a chorion epithelioma, and Dr. N. FALKINER showed some plates which he had presented to the School of Physic.

## EDINBURGH OBSTETRICAL SOCIETY.

AT a meeting of this Society held on Feb. 10th Dr. R. W. JOHNSTONE, the President, took the chair, and Dr. JAMES YOUNG read a communication on the

*Embedding Changes in the Uterine Mucosa as Studied in an Early Human Ovum.*

The ovum, he said, was situated in a completely closed implantation chamber, but extending from its outer surface through the entire thickness of the mucous membrane there was a narrow stalk of trophoblast which indicated the track of entrance. Externally it measured $1{\cdot}5 \times 0{\cdot}77 \times 0{\cdot}6$ mm., and the trophoblast consisted of the usual dual cellular elements. There was no evidence of the vacuolation of the syncytium present in the Bryce-Teacher ovum, which he believed to be probably abnormal. The blastocyst measured $0{\cdot}44 \times 0{\cdot}3$ mm.; it was filled by mesoblast and there were no villi. The embryonic area was too badly damaged to allow of a satisfactory study. The ovum in its general features resembled the two earliest ova so far described—namely, those of Miller and Kleinhans. The maternal changes were similar to those which Dr. Young had described in 1910. To understand these changes it was necessary to remember that the uterine mucous membrane was unique amongst the tissues of the human organism in so far as its function, both during the menstrual cycle and during pregnancy, was fulfilled by a discharge of blood from its vessels. The mucosa thus bled in anticipation, and it bled again with realisation. Despite the unique character of this phenomenon it had often been believed that the menstrual bleeding and the bleeding of pregnancy were necessarily two different processes. In one case it was due to the ovarian hormone, whilst in the other it was thought to be due to the active destruction of the vessel-walls and the mechanical liberation of the blood. But if the bleeding that was essential to placentation could be accomplished in this mechanical way, why then, it was asked, had there been built up all the physiological and structural complex, whose obvious function was an immediate opening up of the vessels and a discharge of the blood at the very regions where the ovum could be expected to appear?

In his previous work Dr. Young professed to have solved this obvious dilemma by showing that the bleeding of the menstrual cycle and the bleeding round the engrafted ovum were essentially similar and were due, in each case, to the response of a specially constructed and specially sensitised tissue to a biochemical material. He had shown that during pregnancy the vessels open up in a way which is exactly similar to that operating in the pre-menstrual phase. His views, published 16 years ago, on the essential similarity of the menstrual and placental hormones in so far as the uterine changes were concerned were supported by the recent work of Allen and Doisy and others, who had shown that pre-œstral changes in ovariectomised animals can be induced by both ovarian and placental extracts. Dr. Young had previously shown that the ease with which this "bleeding" response occurred was due to the fact that the stroma of the mucosa consists of a soft undifferentiated tissue, in which the vessels are devoid of any supporting elements, muscle, fibrous, or elastic tissue.

The nature of the maternal reaction in his present very early ovum confirmed his previous results. In a wide zone round the implantation chamber the vessels were expanded in a sinus-like manner and in areas distant from the trophoblast their contents were being poured freely into the stroma. The result of this bleeding response to the chorionic secretion was a virtual advance of the nourishing blood fluids towards the ovum, and, in the immediate vicinity of this, a pouring of the blood into the implantation chamber from vessels, which were thus like rivers that had overflowed their banks. Only by an understanding of these phenomena could we appreciate the function of the decidua. It was obvious that these maternal changes were temporary and had as their sole purpose the needs incidental to embedding. After this was accomplished and a sufficient blood-supply was provided, it was clear that the active displacement of tissue which they implied had to be arrested. This later and entirely different phase in placentation could only be possible in one or other or both of two ways—by a suspension of the chorionic secretion or by a protective mechanism on the part of the maternal tissues. Dr. Young in this connexion showed sections of pregnant tubes in which the only regions where the tissues were protected against a tearing up by the œdematous and hæmorrhagic escape provoked by the chorionic secretion were the regions, in the mucous membrane, where a decidual reaction had occurred. He believed that in the uterus in normal pregnancy the decidua acted in a similar way. A recognition of these facts could alone explain why the whole mucosa—that is, the whole of the sensitive tissue—must necessarily undergo a decidual change.

## LEEDS AND WEST RIDING MEDICO-CHIRURGICAL SOCIETY.

*Sanocrysin.*

AT a meeting of this Society held on Feb. 26th, with Mr. A. L. WHITEHEAD, the President, in the chair, Prof. T. R. ELLIOTT (London) read a paper on Sanocrysin in Tuberculous Infections. He gave a résumé of the British and foreign experience of this drug, pointing out that it was now given in smaller doses than at first, so that dangerous reactions should be avoided. It was possible, he said, that this gentler method of using sanocrysin was less effective in arresting the disease. In the discussion which followed Prof. Elliott expressed the opinion that it was unlikely that the drug would prove useful in lupus. He did not feel that its use was justified in cases of renal tuberculosis.

DONATIONS AND BEQUESTS.—The late Dame Louisa Brandreth Aldrich-Blake left by will, among other bequests, £1000 and all her medical and surgical instruments and appliances to the Elizabeth Garrett Anderson Hospital for Women, Euston-road, N.W.; £1000 to the London (Royal Free Hospital) School of Medicine for Women, for the Endowment Fund; and £1000 to the Royal Free Hospital.—Mr. George Duckworth Atkin, of Lindfield-gardens, bequeathed by will, in addition to other legacies, £105 each to the London Hospital, Charing Cross Hospital, St. Bartholomew's Hospital, the Royal Free Hospital, University College Hospital, the Middlesex Hospital, the Royal Orthopædic Hospital, and the Chelsea Hospital for Women; £52 10*s.* each to the Royal Eye Hospital, the Poplar Hospital for Accidents, and the Paddington Green Children's Hospital.—Mrs. Emily Topham, of Hunthill, Folkestone, who left estate of the gross value of £247,700, besides other bequests, gave £1000 each to the Westminster Hospital and Dr. Barnardo's Homes, and the ultimate residue, which will amount to about £120,000, equally between the Westminster Hospital, the London Hospital, and St. George's Hospital, in each case for the benefit of diabetic patients, directing that any hospital interfering with the discretion of her trustees or commencing an action to dispute such should forfeit all interest under her will.—Mr. E. Cecil Jones has given £10,000 towards a children's section of the new hospital for Southend-on-Sea as a memorial to his late father, Mr. R. A. Jones. Lord Elveden has given £20,000 and a site of 12 acres.

# Reviews and Notices of Books.

## INFANT WELFARE.

*Modern Methods of Feeding in Infancy and Childhood.* By DONALD PATERSON, M.B., M.R.C.P., and J. FOREST SMITH, M.R.C.P. London: Constable and Co. 1926. Pp. 106. 7*s.* 6*d.*

THE latest volume of the Modern Medical Monographs, edited by Prof. H. Maclean, is devoted rather more completely to the feeding of the infant than is indicated by the title. The authors have presented the subject in a scientific and impartial manner, recognising the fact that no type of infant feeding has proved universally successful, and that good results are obtained by a number of different methods. The part played in nutrition by the various components of milk, and the composition of different infant foods, are clearly set out in the first chapter. In dealing with artificial feeding the authors give an account of four methods: whole milk, humanised milk with a single formula, percentage feeding, and simple dilution with addition of carbohydrate. The merits and disadvantages which they have found to be associated with each are indicated; they suggest simple dilution with addition of carbohydrates as the method of choice for the majority of bottle-fed infants. The weight rather than the age of the infant is taken as the indication for weaning, mixed feeding being recommended as soon as the child reaches 15 lb. One of the great merits of this book lies in its recognition of the importance of providing students and practitioners with regimes which are simple enough to be universally practicable; it may be recommended to all who wish to obtain a well-balanced idea of this much discussed subject.

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*Diseases of Infants and Children.* By H. D. CHAPIN, M.D., Professor of Diseases of Children, New York Post-Graduate Hospital; and L. T. ROYSTER, M.D., Professor of Pediatrics, University of Virginia. London: Baillière, Tindall and Cox. 1925. Pp. 633. 30*s.*

THE fifth edition of Chapin and Pisek's text-book has been brought out by Dr. Chapin in collaboration with Dr. Royster. A large part of the book has been rewritten, and much new matter has been added. A considerable portion of the book has been devoted to infant feeding and the diet of children. For artificial feeding of infants the authors favour an extremely low fat content, and are impressed with the advantages of lactic acid milk. An excellent account is given of the infectious fevers, illustrated by some realistic colour-plates. Diseases of the nervous system are treated perhaps too briefly; a few statements are found which will not escape challenge, such as that the movements of chorea are produced by irritation of the Rolandic area. Recent work on the biochemistry of rickets has been included; the authors adhere firmly to the dietetic view of its causation. Some complicated differential diagnoses, such as those of the anæmias and splenic enlargements, are very clearly presented in tabular form.

The book is well illustrated and of convenient size, and may be recommended as an admirable text-book for students and practitioners.

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## LOCAL ANÆSTHESIA OF THE FACE AND NECK.

*Lehrbuch der Lokalanästhesie des Ohres, &c.* By Dr. CÆSAR HIRSCH, Chief Surgeon to the Throat, Nose and Ear Department, Marienhospital, Stuttgart. Stuttgart: Ferdinand Enke. 1925. Pp. 293. M.25.

IN this book Dr. Hirsch provides a very thorough account of local anæsthesia as applied to operative work on the ear, eye, nose and accessory sinuses, face, mouth and pharynx, neck, larynx, trachea, and œsophagus. After a preliminary consideration of the object of, and indications for local anæsthesia, and of pain in general, a short history of the subject is given; then follows a full description of cocaine, its chemical constitution, its action, and its pharmacology. Some of the cocaine-substitutes are similarly dealt with, notably, alypin, novocain, psicain, and tutocain; of these the author rightly states that the earlier pronouncements on the safety of alypin have not been justified, but he obtains satisfactory results with all the other four drugs. For surface application to the mucous membranes he finds that potassium sulphate, carbolic acid, and suprarenin all enhance the effect of cocaine, and advises cocaine 3 parts, sulphate of potash (2 per cent. solution) 20 parts, adrenalin (1 in 1000) 10 parts, carbolic acid solution (½ per cent.) to 100 parts, which he states to be equal in potency to a 10 per cent. ordinary solution of cocaine. Phenol also increases the potency of tutocain, while sulphate of potash does not, and a perfect anæsthesia of the larynx is obtained by a 5 per cent. solution of tutocain with adrenalin and phenol; psicain is used similarly in 2 to 4 per cent. solution, while novocain is not considered satisfactory for surface application. For injection novocain is preferred in ¼ to ½ per cent. solution; the solvent solution is made up of sodium chloride 7 parts and potassium sulphate 4 parts, to 1000 parts of water, to which 3 to 5 drops of dilute hydrochloric acid are added to neutralise the absorption of alkali from the glass if the solution has to be kept for a long time. Adrenalin is added in the proportion of 1 drop per cubic centimetre. Tutocain may be similarly employed in half the strength at which novocain is used. Cocaine has been abandoned for injection, and psicain is not mentioned for this purpose; the quinine derivatives are rejected on account of their harmful effects upon the tissues. The greater part of the book is occupied by descriptions of the technique of obtaining local anæsthesia for practically every operation on these regions; these are admirably complete and are profusely illustrated. A good index and a bibliography are provided.

Dr. Hirsch has produced an invaluable and indispensable work of reference on an important subject.

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## MIND AND MEDICINE.

By THOMAS W. SALMON, M.D., Professor of Psychiatry, Columbia University. New York: Columbia University Press. Pp. 34. 5*s.*

THIS short lecture, delivered at the opening session of the College of Physicians and Surgeons at Columbia University, surveys the modern attitude of medicine towards the problems of the mind, and pleads for the impartial recognition of mind, will, and personality as factors equal in importance to the processes of physiology and biochemistry. Dr. Salmon suggests that the physicians of 70 years ago recognised no such cleavage between body and mind as do the pathologists and biologists of to-day, and that the "deadly parallelism" which practically excludes mental disorder from general medical interest springs from the wealth of new methods of investigation, and the resulting attitude that no real functional disorder can exist without an observable structural defect to account for it. There are many able men in this country who hold the same views as Dr. Salmon, and there is every prospect that the problems of mental disease will before long regain the prominence that their importance so urgently demands.

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## THE GREAT ABNORMALS.

By THEO. B. HYSLOP, M.D., F.R.S.E., Gaskell Scholar in Psychological Medicine, &c. London: Philip Allan and Co. 1925. Pp. 289. 8*s.* 6*d.*

Dr. Hyslop gives a history of some of the great ones of the earth whose mental abnormalities have been disastrous to mankind, of others whose genius was joined to eccentricities that, but for the chance that placed them in other times than ours, would have led to their confinement as insane, and he also describes epidemics of irrational beliefs and behaviour that

leave the uncomfortable feeling that perhaps there is no guarantee that civilised man may not relapse into similar error. The vagaries of despots like Ivan the Terrible, the effects of mass suggestion as shown in the Crusades, in witchmania and alchemy, are more interesting than encouraging, and in a chapter on the early history of Bedlam the author reveals his belief that the world outside differs little in its methods and sentiments from the world inside. Studies of visionaries, of whom Swedenborg stands as a type, and of the foibles of men of genius, complete this historical survey. The conclusions to be drawn from the material presented are not clear, but the reader will make acquaintance with a vast range of mental abnormality that has existed without contemporary recognition of its pathological nature.

## JOURNALS.

JOURNAL OF INDUSTRIAL HYGIENE. February, 1926.—The use in America of tetraethyl lead in motor spirit to increase its explosive power is said to be introducing a new health hazard. The subject has been investigated by F. B. Flinn, of Columbia University, who experimented on a number of different animals, testing them for skin absorption, and also by exposure to fumes of the fortified spirit. After an exhaustive inquiry, which is reported in detail, he concluded that the lead compounds can be absorbed faster than the lead can be excreted. Definite malaise may occur and prolonged exposure to such risk must constitute a health hazard. He also found that animals absorbed lead from the fumes, and that the effects were obtained more rapidly than by skin absorption. The fortified spirit placed on sale used to contain 1 part of the lead compound to 1000 parts of spirit, but the vendors have already altered the mixture to 1 part in 1300. The whole question has been causing considerable interest in the United States.—Some interesting cases of occupational poisoning by mononitrochlorobenzene are reported by A. Renshaw and G. V. Ashcroft. Four cases were carefully observed in hospital. They exhibited a peculiar slate-grey and cyanotic appearance, and suffered from dyspnœa, collapse, and throbbing in the head; the breath smelt of oil of bitter almonds, and the blood was of a peculiar chocolate colour. Men collapsed after about three days' work, and apparently the poison was absorbed as a vapour through the lungs. The symptoms are ascribed to anoxæmia due to the hæmoglobin of the blood being attacked and to its oxygen-carrying powers being diminished thereby. There was some anæmia due to interference of the function of the bone-marrow.—An account is given by L. Noland, of the organisation of the industrial health department of the Tennessee Coal, Iron, and Railroad Company, which employs some 23,000 persons, and houses them as well. The company embarked upon a health programme in 1913, and now has a staff of seven sanitary inspectors attending to the water-supply, sanitary conveniences, mosquito control, fly protection, food- and milk-supplies, and bath houses of the community. It also has a force of 46 whole-time doctors, who examine all new workers, and men who have been absent for 15 days or more when they resume work. As many as 206,223 patients were treated at dispensaries in 1924; 92,032 calls were made on the homes of the workers, and 26,252 examinations of new or re-employed men were made. There are 14 whole-time dentists, who find it impossible to do all the work brought to them. The company also keeps up a hospital with 310 beds, staffed by 19 physicians dealing with various specialties. Many social activities, such as schools, club houses, and recreation grounds are also maintained. The president of the company considers that, although the yearly expenditure is large, the health department is, nevertheless, a very profitable investment. Labour turnover has been reduced by two-thirds, lost-time is much less, each day's work is more productive, and the workers (paid by the piece) earn more. There is also more contentment and less friction between labour and management.

# Reports and Analytical Records.

## HYPEROL.

(F. W. BERK AND CO., 106, FENCHURCH-STREET, E.C. 3.)

Hyperol is known as solid hydrogen peroxide and is prepared by combining hydrogen peroxide and urea in molecular proportions. It is a white crystalline body with the formula $CO(NH_2)_2H_2O_2$. Its stability at ordinary temperatures renders it of particular use in tropical climates. Hyperol is soluble in water, dissociating rapidly in solution with formation of urea and hydrogen peroxide. When analysed the preparation was found to contain 35 per cent. of hydrogen peroxide as compared with the theoretical 36 per cent. A trace of acidity is present, probably derived from citric acid. As an oxidising agent of high efficiency and purity, hyperol will be of use to the medical man and the chemist.

Hyperol is also supplied in the convenient form of tablets, each one containing 8 gr. of 35 per cent. hydrogen peroxide. On analysis these tablets were found to contain 31 per cent. hydrogen peroxide, a little starch used for binding purposes being also present. These tablets will be found convenient as a source of hydrogen peroxide for toilet purposes and some use.

## NESTLÉ'S CREAM.

(NESTLÉ'S AND ANGLO-SWISS CONDENSED MILK CO., 6 AND 8, EASTCHEAP, LONDON, E.C. 3.)

This cream, which is described as "pure thick," was contained in a tin the contents of which weighed 11·5 oz. When analysed it was found to have the composition:—

| | Per cent. |
|---|---|
| Fat | 27·2 |
| Sugar (lactose hydrate) | 3·4 |
| Protein | 3·8 |
| Ash | 0·4 |
| Water | 65·0 |

The total solids were 35 per cent. and the solids-not-fat 7·6 per cent. No preservatives or thickening agents were found. The cream is thick, homogeneous, and has the slightly cooked flavour which is inseparable from pasteurisation, but this is not masked as in some preparations by the addition of cane sugar. The cream can be described as a pure product and this knowledge will doubtless be of use to the practitioner.

## STAPHAR.

(DICK COATES AND CO., 41, GREAT TOWER-STREET, LONDON, E.C. 1.)

This preparation is well known on the continent and has been the subject of satisfactory communications to the *Deutsche Medizinische Wochenschrift*, among other well-known journals. A staphylococcus vaccine, originally prepared by Prof. Strubel, it is recommended in a great many septic conditions of the skin, some of which have features in common such as sycosis, acne, carbuncles, and boils, and in certain forms of eczema and mastitis. The clinical accounts suggest that the use of the vaccine is free from danger in proper dosage and that in suitable cases injection is followed by prompt subsidence of the symptoms. It is supplied in boxes containing three, five, or ten glass sterilised ampoules of 1 c.cm. each, and these should be well shaken before use in order to obtain a uniform emulsion.

## BISTOVOL.

In a communication on the Chemotherapy of Syphilis, published by Prof. Levaditi in THE LANCET of Jan. 30th, reference is made to basic acetyloxy-aminophenyl arsinate of bismuth. Messrs. May and Baker, Limited, point out to us that this product, in oil suspension, has been placed on the market by their firm under the registered name of "Bistovol."

# THE LANCET.

*LONDON: SATURDAY, MARCH 13, 1926.*


## THE PREVALENCE OF INTRATHORACIC TUMOURS.

ARE new growths in the chest on the increase? The recent discussion at the Royal Society of Medicine on intrathoracic new growths, reported in our columns,[1] has raised a question by no means uncommon amongst present-day problems of medicine. When the recorded cases of a disease increase markedly in number can we safely assume that the particular disease is actually increasing in prevalence? Obviously not. After the statistician has made his necessary corrections of the crude death-rate we are still faced with the possibility that improved methods of diagnosis, greater facilities for post-mortem examinations, and improved technique in laboratory examinations of all descriptions may bring a particular disease into greater prominence than it has previously attained. Even the historical approach is not without its pitfalls. The morbid anatomists of the first half of the nineteenth century were remarkably acute observers and doubtless missed very little that the unaided eye was capable of teaching them; but they laboured under great disadvantages, and we have only to try and visualise a pathological department without a microscope—especially without an oil-immersion lens—to realise how great were their handicaps. Although the morbid anatomist of a previous generation failed to record intrathoracic tumours in any considerable numbers, we cannot be sure that such tumours were, in consequence, actually rare. The question would appear, at present, to be unanswerable; there are too many unknown quantities in the equation.

The relative proportions in which the different varieties of these intrathoracic tumours occur is perhaps a less difficult question, but even here English, Continental, and American statistics will be found to differ. Setting aside benign tumours, the commonest form of primary malignant tumours within the thorax is, in English statistics, sarcoma of the mediastinum, whilst malignant growths of the pleura are the rarest, and carcinoma of the lung occurs in an intermediate position. Unfortunately, however, the collections of cases in this country are relatively small in number. In America Drs. J. S. GROVE and S. E. KRAMER[2] have recently shown that carcinoma of the lung is by no means a rare disease. They state from an extensive survey of the literature that this disease is found in 0·15 per cent. or more of all autopsies, that about 1 per cent. of all carcinomata are pulmonary, and that the disease forms 2 per cent. of all deaths from pulmonary disease. There appears, further, to be some evidence that this increase in pulmonary new growths has been coincident with the recent epidemic of influenza. The authors also quote facts which throw doubt on the old Schneeberg statistics for carcinoma of the lung. The figures given by HARTING and HESSE in 1878 showed that 79 per cent. of all deaths amongst the miners of the Schneeberg district of Saxony were due to this disease. These returns were, however, not adequately checked by post-mortem examinations, and more recent research has shown the probability that both pneumonokoniosis and tuberculosis were responsible for many of the so-called carcinoma deaths. Research work in other quarters seems to indicate that the older authorities not infrequently confused pneumonokoniosis with new growth. Indeed, the whole question of interpreting the older sets of figures is uncommonly difficult. Obviously differential diagnosis is of peculiar importance in this disease, and it would be safe to say that more rapid strides have been made on this aspect of the subject than on any other. Radiology has doubtless played an important part in this advance. Radiograms of the chest increase in diagnostic value year by year, and the recent introduction of lipiodol has added yet another weapon to the armament of the radiologist. In his introduction to the discussion at the Royal Society of Medicine, Dr. L. S. T. BURRELL[3] stressed also, amongst other diagnostic points, the importance of the absence of tubercle bacilli in the sputum. We are too apt to assume that a negative sputum test means nothing, whereas in point of fact it may mean a good deal. Yet another common pitfall is the Wassermann reaction. More than once it has been our experience to see a diagnosis of malignant tumour of the thorax withdrawn on receipt of a positive Wassermann reaction report, only to find at the autopsy that malignant intrathoracic tumour was the correct diagnosis. The possibility of confusion with aneurysm is obvious, but, after all, there is no reason why a patient with malignant disease should not have previously had venereal disease; indeed, it is possible that syphilis may be a predisposing cause of malignant lung, as it is of certain other forms of malignant disease. If, therefore, there are good grounds for the diagnosis of the malignant intrathoracic growth, a positive Wassermann test need not necessarily engender doubts of the original diagnosis. Pyrexia and night sweats, too, are frequently misleading signs. All intrathoracic growths sooner or later become septic from retained secretion and not infrequently this complication may effectively obscure the true picture. The association of pulmonary tuberculosis with carcinoma of the lung was emphasised by Dr. BURRELL in the recent discussion; it constitutes yet another pitfall. Finally, pleural effusion repeatedly recurring after tapping may mask the usual signs of growths. The difficulties of differential diagnosis are, therefore, many and various, and it is small wonder if, in the absence of the newer aids to diagnosis, these cases are sometimes wrongly diagnosed. The importance of early diagnosis was emphasised by more than one speaker during the discussion. To wait until unequivocal signs of pressure clinch the diagnosis is to wait until all possibility of surgical aid is past. This disease or group of diseases is, in short, a typical example of the value of the modern method of team work. Laryngologist, pathologist, radiologist, and surgeon can all assist the physician and none of them can be safely omitted from the team.

The histological features of malignant intrathoracic growths offer much scope for research, and attention

[1] THE LANCET, Feb. 27th, p. 468. The discussion was carried on from 5.30–10 P.M. with an interval of half an hour at 7.15 P.M. for refreshments. This innovation was, we understand, justified by results and is to be repeated.

[2] Amer. Jour. of Med. Sci., 1926, clxxi., 250.

[3] THE LANCET, Feb. 27th, p. 435.

having been called to the existence of this fund of material it is likely that, in the near future, more results of pathological investigation will be forthcoming. Thus the group of tumours at present designated sarcoma of the mediastinum offers an especially interesting opportunity for research. By reason of their pressure symptoms they are perhaps more commonly diagnosed during life than are the pulmonary carcinomata, and clinically they form a clearly defined group. From the pathologist's point of view, however, they raise all manner of difficult questions. The histological picture is peculiar, so much so that some pathologists are disinclined to admit that they are true sarcomata. The predilection of these tumours for the middle mediastinal group of glands, the two well-defined paths of extension by the deep and superficial lymphatics of the lung causing markedly different pathological pictures, and the liability to track down the walls of the superior vena cava into the right heart, all add to the diversity of the situation. The pulmonary carcinomata vary in naked-eye appearance to such an extent that it is frequently impossible to decide upon their true nature without careful histological examination. Drs. GROVE and KRAMER, in their article quoted above, enumerate five different varieties—viz., infiltrating, multiple nodular, solitary nodular, miliary, and mixed—with a histological picture of cylinder-celled, squamous, or mixed-cell type. Of these, the miliary is admittedly the most difficult to recognise naked-eye, being liable to be confused at first sight with tuberculosis. The point of origin of these tumours is obscure, and this obscurity is rendered greater by the fact that the specimens are not usually obtained early from the operating theatre, but at the end of the course of the disease, from the post-mortem room, when sequelæ and complications have obscured the picture. There would appear, however, to be some evidence for believing that the majority of these tumours arise from the bronchial mucous membrane. One point worthy of special mention is their not infrequent symbiosis with tuberculosis. In some quarters this symbiosis has been adduced as evidence for the view that tuberculosis is a predisposing cause of carcinoma. There are, however, two other possible explanations—viz., (1) the tubercle bacillus may be a terminal infection as it so frequently is in lymphadenoma, or (2) that carcinoma growing in a lung may readily light up a quiescent tuberculous focus. At any rate, with the extreme liability of the lung to become infected with tuberculosis, it is not surprising that *B. tuberculosis* should be found in association with any other pulmonary lesion. Little can be said concerning the ætiology of these malignant intrathoracic growths. The evidence of the arsenic and cobalt miners of Schneeberg, the suggested relationship between pulmonary carcinoma and the recent influenza epidemics, the after-effects of war gases, and the modern practice of tarring roads, all seem too vague and indefinite to be reckoned with as directly causative factors.

There remains the question of benign intrathoracic growths. Here, again, is a subject for research. Hitherto these cases have been described almost as curiosities; very little is known concerning them, and not being directly fatal they only rarely reach the post-mortem table. Routine radiological examinations of the chest in hospital patients would soon elicit the needed facts as to the prevalence and character of this hitherto little recognised group of diseases.

## A CHARGE OF NEGLIGENT DIAGNOSIS: THE JUDGE'S OPINION.

WHEN a medical practitioner is sued in the law courts for damages for some negligence towards a patient, the task of deciding whether he was negligent or not is one for the jury and not for the judge. Experienced judges refrain from expressing their personal views except in cases where the administration of justice will otherwise suffer. Exceptional weight, therefore, attaches to the following opinion delivered by Mr. Justice MCCARDIE in the recent action brought by Mrs. VENN against Dr. J. M. TODESCO and Dr. J. ELDER.

"I myself have formed the conclusion that upon this evidence before the court these defendants ought not to be found guilty of negligence. I further feel, if one weighs the documents and the whole of the testimony in this case, that if a doctor were to be found guilty of negligence upon such evidence as that before us, then no doctor would be safe."

The learned judge made these striking observations with the knowledge that this was the second of two protracted trials, and that, after a hearing of several days and before the case for the defendants was fully developed, the jury had intimated to him that eleven of them were in favour of a verdict for the defence, while only one was in favour of a verdict for the plaintiff. After this intimation, counsel for the plaintiff having declined to accept a majority verdict, the case proceeded to a finish two days later with the negative result that the jury still disagreed in the same proportion as before. The trial was therefore abortive and the case goes back into the list for yet another hearing. There remains also a point of law to be argued whereon the defendant doctors may be held relieved from liability by virtue of the Public Authorities Protection Act; but there was a hint that the legal authorities are here in conflict and that the point may require decision in the House of Lords. When it is added that the plaintiff Mrs. VENN—for whom in the loss of her husband everyone will feel sympathy—is suing under the Poor Prisoners Rules, and that her solicitor and leading and junior counsel are giving their services without the ordinary reward, the position of Dr. TODESCO and Dr. ELDER is seen to be unenviable. They are put to heavy expense in the necessary defence of their professional reputation, and they will not recover one penny of their costs when they succeed in that endeavour.

The circumstances of the case may be briefly outlined. Mrs. VENN'S husband, 60 years of age, was removed to Croydon Borough Hospital on March 18th, 1922, on the advice of his medical attendant, Dr. E. G. D. MILSOM. He had then been suffering for at least three weeks from scarlet fever. It turned out that he suffered from diphtheria as well; at any rate, both those diseases were notified. He gradually made progress towards recovery from them, but on April 26th he underwent an operation for a deep-seated abscess in the hip. Blood poisoning set in and he died on June 15th. Legal proceedings were begun in the following December. His widow complained that there had been negligent delay of between six and seven weeks at the isolation hospital before Dr. R. V. CLARK (the medical superintendent) examined him, and that Dr. TODESCO (resident medical superintendent at the hospital) and Dr. ELDER (then assistant

resident medical officer) were negligent in not properly diagnosing the abscess. The claim came before the Lord Chief Justice and a special jury last June. There was a definite verdict in favour of Dr. CLARK, but the jury disagreed, as they have now disagreed again, as to the liability of his two colleagues. Much of the medical history of the case was undisputed; Mr. Justice MCCARDIE commented more than once upon the care and fairness with which the medical evidence was given; the case for the defence was supported, as he observed, with an exceptional quantity of contemporary documents—the admission card with unusual details, the temperature chart with unusual details, and the nurse's reports, while the entries were made at a time when there was no conceivable motive for falsification. The disputed matters were mainly the following. There was an entirely honest doubt whether the information given by Mr. VENN'S original adviser, Dr. MILSOM, when the patient was brought to the hospital, really reached the hospital staff. Dr. MILSOM spoke of deep-seated inflammation, but said he never used the word abscess. Mrs. VENN and her son stated that Dr. MILSOM used the word and that the hospital doctors were so informed. Mrs. VENN alleged that her husband's thigh and hip were swollen in great lumps, the inference being that the body was septic at an early stage of his stay in hospital and that the abscess should then have been diagnosed and treated. The hospital doctors' evidence, the nurse's reports, and the temperature chart negatived this; the deceased had attributed pain and tenderness to rheumatism. The case, as already stated, was a charge of diagnosing too late the existence of the abscess, and Mr. JUSTICE MCCARDIE in summing up made some remarks on diagnosis which should be widely read:

"A doctor," he said, "must show and exert towards the patient reasonable skill and reasonable care. In the medical profession, as in other professions, there are men of different gifts—for example, in surgery there is the man who possesses singular powers of insight, great operative capacity, and who gains a world-wide reputation. There is, on the other hand, the man who possesses ordinary gifts, ordinary skill, and the ordinary capacity for care. That is the standard that must be applied. . . . Difficult though diagnosis is with respect to many matters, there is no matter with respect to which it is so difficult as with regard to a deep-seated abscess. . . . It is not negligence for one doctor, competent and careful, to form one opinion, and another man, as competent and careful, to form another opinion. In fact, in my view, it is the duty of a medical man . . . to form his own opinion honestly and to the best of his ability, and, having formed his opinion, to express it. The professional man who fails in that fails, in my view, in his duty as much as a judge who, having formed an opinion of the case, lacks the courage to express it."

**It might be improper to comment upon the evidence in a matter which in a sense is still sub judice, but there can be no objection to repeating the judge's opinion.**

## THE STERILISATION OF MENTAL DEFECTIVES.

RECENT correspondence in the *Times* (Jan. 18th and 20th) and a leading article in *Nature* (Feb. 20th) have raised again the question whether it is better to prevent the feeble-minded having children by segregating them under control in institutions or by sterilising them. If the prevention of their reproduction were the only pertinent consideration the advocates of sterilisation have a strong case. It is not clear whether the proposal is to de-sex by castration or simply to prevent reproduction by dividing the vasa or tubes; by either method, however, the desired result is achieved with relatively little trouble and at far less cost than by institutional segregation. But, in fact, we have every reason to believe that to make obvious defectives infertile is only a partial solution of the problem of prevention. "Mental deficiency" is a relative term and difficult, perhaps impossible, to define. But the condition is heritable whether we regard it as a definite character like albinism or as the end term of a series which ranges from clever, through normal and stupid, to a state which is hardly compatible with modern society. Mendelians have satisfied themselves that feeble-mindedness is a unit character and a recessive; Prof. KARL PEARSON concludes that intelligence is a congenital product. Whether the two interpretations are as inconsistent as they may seem at first sight? Whether we are, as appears extremely likely, lumping together a variety of different conditions which are transmitted in ways which are for practical purposes different? What is the position of borderline cases—these and many other questions of the greatest hygienic importance will be left for future solution. Proceeding, however, as we must on what we know rather than on what we do not know, it is really essential that Sir ARBUTHNOT LANE and his colleagues who advocate sterilisation as a "rapid" method of diminishing the numbers of defectives should study further the mode of inheritance of a recessive character.

If the proportion of actual defectives in the population is about 3 per 1000, it is reckoned that about 7 per cent. of people will be unsuspected carriers of feeble-mindedness. The mating of two such apparently normal carriers will give one defective child in four, and half the children will again be carriers; one in four will be really normal. If a carrier mates with a normal there will be no defective children, but half the family will be carriers. These carriers cannot be identified except by the children they produce with an appropriate mate. Hence the apparent paradox that the proportion of cases of mental defect which are the offspring of actually defective parents is quite small; the majority are the children of people who are apparently quite normal. These facts have been related over and over again; Prof. RUGGLES GATES puts the case very clearly in his "Heredity and Eugenics," and it is stated particularly plainly in a letter from Dr. W. M. FELDMAN.[1] Prof. R. C. PUNNETT calculated nearly ten years ago that it would take about 8000 years to reduce the percentage of feeble-minded in the population from 3 per 1000 to 1 in 100,000 by segregating or sterilising those who are themselves feeble-minded. Those who purpose to start any popular movement in favour of sterilisation are in fairness bound to warn the public that they must not expect to see much difference for some time. A character is not necessarily controllable because it is heritable any more than an infectious disease disappears as soon as its parasite is discovered.

But there is no reason why we should not achieve what we can in the way of preventing mental deficiency, and everyone will agree that defectives should not be allowed to breed. The fact, however, that it is only a little which can be done in this way makes one realise that this particular line of attack deals with what is, in a practical world, only a minor part of the whole problem. Those who advocate sterilisation seem to think that nothing but prevention of multiplication is necessary or desirable. But people in general dislike defectives, not because they are apt to produce defectives, but because they are defectives. The village idiot has become repulsive, and hardly anyone will seriously doubt that it is a cruel thing to leave the grosser examples of feeble-mindedness in a world for which they are quite unfitted; it is bad for them and bad for the world, especially for the child world which has not learned what they are. Sterilisation would make them no more fit to be at large; inability to procreate or bear children will not abolish the secondary sexual passions nor will de-sexing save the women from the vileness in every man to which the feeble-minded are such an easy prey. In rougher times defectives were destroyed; they have long been tolerated; the progress of kindliness now requires that they should be taken better care of, and we hope that the county councils will accelerate the provision which is being made for their segregation. Segregation is so desirable that it may be reasonably called necessary; sterilisation is therefore otiose.

[1] Brit. Med. Jour., 1924, i., 766.

# Annotations.

"Ne quid nimis."

## UNIVERSITY REFORM IN LONDON.[1]

FOR those who have and those who have not studied the difficulties to which the University of London has been ever subjected, a volume entitled "University Reform in London," by Mr. T. L. Humberstone, which includes chapters that have already appeared in the *Times*, the *Journal of Education*, and elsewhere, makes interesting reading. For those who have had occasion to watch the various controversies as they developed the book will have its pathetic side, when it is recognised that voluminous discussions, in which men lost their temper as well as the general thread of the debate, can be fairly reduced in a detailed history to a few lines of summary. This is not to say that Mr. Humberstone's story takes the place, for those who want a fully detailed record, of the writings of Sir William Allchin, the reports of various Commissions, and the plenteous serial literature which was topical at the different dates; but this small volume does enable us to see clearly why and how many of the large and bitter divergencies of opinion have arisen.

The attempt to reconcile the ideals of an Imperial examining board with those of a teaching university has been the origin of many schemes during the last 75 years, resulting in proposals for the creation of five or more separate universities, or at any rate of institutions having the right to grant degrees; and all of these various movements have been due to the firm belief of their sponsors that only in their particular way could wisdom be advanced and particular sections of students obtain their best chance. The part that medicine has played in the controversies has been significant, because a faculty of medicine cannot be imagined which takes into consideration only an examining board and not the schools where instruction is given. Again, the fact that, while the metropolis contains a group of the finest medical schools in the world, the university of the metropolis does not offer the students opportunities of graduation comparable to those obtaining elsewhere has needed constant recollection; we may all know the pros and cons of this situation, and how far it has recently undergone modification, without feeling that the inequalities have been removed. The medical aspect of the affairs of London University is not, however, any special feature of Mr. Humberstone's book, though he is clearly aware of the position while discussing the Selborne, the Gresham, and the Haldane Commissions. A particularly interesting chapter makes the complicated episode of the Imperial College of Science and Technology comprehensible, and this is followed by a setting out of the arguments for a single university for London with a summary of recent work under the present charter.

On the vexed question of a central site, Mr. Humberstone has no doubts; he is in favour of the placing of the university on the Bloomsbury site where the area available could be profitably used "for administrative buildings, halls, libraries, headquarters for University societies, and for the Officers' Training Corps, for residential hotels and for numerous social, athletic, and extra-academic purposes, as well as for a group of schools and institutes for research and special subjects, such as a school of law, a school of journalism, a school of military studies, research institutes for comparative pathology and numerous arts, sciences, and professional subjects." The various advantages of the Bloomsbury site are set out presumably as a rejoinder to those who object to this departure, and it is a fair criticism of a valuable piece of work that neither is the formidable nature of the objections dealt with, nor is there any full rejoinder to those who desire to remain in Kensington.

[1] By Thomas Lloyd Humberstone, B.Sc. Lond., Associate of the Royal College of Science, London; late Mitchell Student of the University of London. With an introduction by H. G. Wells. London: George Allen and Unwin, Ltd. 1926. Pp. 192. 7*s*. 6*d*.

## RESPIRATION AND ANÆSTHESIA.

THE more that the physiology of anæsthesia is studied the more striking becomes the predominance of the part played in the process of narcosis by respiration. Indeed, the physiology of respiration may be said to dominate the physiology of anæsthesia, and all else to be subservient to the part played by the respiratory current and its resultant effects on the composition and the circulation of the blood. The overwhelming part played by respiration in both the induction and the maintenance of inhalation anæsthesia is, or should be, as obvious to the practising anæsthetist as it is to the worker in the physiological laboratory. Nevertheless there has certainly been a tendency for his attention to be drawn too much to other subsidiary phenomena—blood pressure, for example, or the state of the eye—and too little riveted on what is actually the key to the whole problem—the breathing. It is true, of course, that mechanical obstructions to respiration have received due attention, and indeed the importance of evading obstructive swelling and spasm of the upper air passages was a fundamental doctrine of the teaching of the late Sir Frederic Hewitt. The less obvious defects of respiration, however, and their direct influence upon the patient's condition were undetected or little understood, and it is to physiological work that we owe an advance in knowledge of these practically most important matters. When the physiologist and the anæsthetist are allied in work of investigation the results are likely to be both interesting scientifically and valuable in practice. The paper read recently by Prof. M. S. Pembrey in conjunction with Dr. F. E. Shipway is a case in point. Prof. Pembrey's observations on apnœa are enlightening, while his insistence on the rôle of carbon dioxide as the paramount respiratory stimulant is paralleled on the clinical side by cases that Dr. Shipway quotes to show how the breathing may be brought to an end in practice by the free washing out of that gas. Apnœa is most likely to arise during the anæsthesia produced by intratracheal insufflation. Pembrey records a case in which 16 litres of air per minute sufficed to oxygenate the blood, but 30 litres produced apnœa for a period of two minutes. The blood pressure fell during the period of rapid lung ventilation. During the period of apnœa it gradually rose, and as the tension of carbon dioxide in the blood increased the patient began slowly to breathe again. Another form of anæsthesia which may be associated with apnœa is that due to "gas and oxygen" breathed through valves over considerable periods of time. The acapnia which may be thus instituted is shown by pallor, a cold, clammy skin, feeble breathing and a quickened pulse, and is in striking contrast to the full colour, exaggerated respiratory movements and full pulse that are brought on by the presence of carbon dioxide in excess. Both these types of cyanosis are not uncommonly seen clinically, and their essential difference has to be appreciated by the practical anæsthetist. It is around the function of carbonic acid gas in the lungs and in the blood that the chief recent contributions to the physiology of anæsthesia have arisen. Starting from Haldane's original demonstrations of the significance and relations of the volume of air breathed, workers, among whom are prominent Yandell Henderson, H. W. Haggard, and S. R. Wilson, have arrived at important truths concerning respiration in anæsthesia which had hitherto not been made plain. The practical application of these truths lies in the suggestion that by due use of $CO_2$ in induction the respiration may be so stimulated that with exaggerated ventilation of the lungs a large supply of anæsthetic at the safe concentration may be rapidly inhaled. In this way the concentration of anæsthetic in the nerve centres necessary for anæs-

thesia may be rapidly and safely reached. The other practical use of $CO_2$ is at the close of anæsthesia when again, by inducing vigorous respiration, the anæsthetic may be rapidly washed out of the blood and lungs, and recovery be expedited with consequent diminution of after-effects. With regard to the first of these two practical propositions there is an objection that arises in practice which is not apparent in the laboratory. This depends on the sensations of the patient. Anyone who has experienced the sensation of entering anæsthesia with nitrous oxide or with ether through the medium of forced breathing will assert that he has no desire to repeat the experience. There is no doubt that the physiological method is safe and certain, but it is extremely uncomfortable as compared with a more gradual induction. Moreover, although so far with ether it has appeared safe, there is the general principle to be borne in mind that sudden changes of bodily conditions are, generally speaking, inadvisable as compared with gradual changes. Medicine provides numerous examples which show that a particular condition may be harmless if gradually reached, dangerous if suddenly instituted; and it is not unlikely that anæsthesia complies with this general rule. So far as we are aware the experiment has not been made of rushing a patient into chloroform anæsthesia by exaggerated inhalation of a safe percentage vapour, and we are inclined to doubt the wisdom of making the experiment. The value of forced breathing to rid the body of the inhaled anæsthetic is another matter and appears to be a most valuable addition to the anæsthetist's powers to avoid deleterious results from his administration. It is obvious that so efficient a weapon as carbon dioxide needs careful handling. and scrupulous control must be exercised of the percentage vapour administered after anæsthesia. The proper percentage in oxygen appears to be about 7. The disadvantage of employing the obvious and most simple means of supplying $CO_2$—namely, by making the patient re-breathe his own expirations—is that these must contain a considerable amount of the very anæsthetic vapour which is to be expelled. The necessity for carrying yet another cumbrous cylinder, containing the required percentage of $CO_2$ in oxygen, may be avoided, as Dr. I. W. Magill has pointed out in our columns, by the use of sparklet bulbs.

## RATE-AIDED HOSPITALS.

SOME remarkably interesting particulars of the extent to which hospital accommodation is provided or aided by local authorities were recently given by the Minister of Health in answer to a Parliamentary question. Mr. Chamberlain stated that there is only one large general hospital provided by a local authority. He did not mention its name, but he was obviously referring to the City of Bradford Municipal General Hospital, with its 750 beds. Add to this three relatively small accident hospitals and the number of general institutions so provided is exhausted. There is no official information on the number of cases in which voluntary hospitals are municipally aided apart from services rendered to the municipality, but before long they will probably reach a respectable total. By last year's Public Health Act, which has been in operation only six months, local authorities have power to help voluntary hospitals to the extent of a penny rate, but it has as yet been very little exercised. Municipal hospital activities of a statutory character have now become very extensive. Thus, there are 158 tuberculosis hospitals with nearly 11,000 beds; 1040 hospitals for acute infectious diseases with approximately 37,700 beds; 68 maternity institutions with 908 beds, not including maternity wards in general and Poor-law hospitals; and a dozen babies' hospitals with 260 beds. The tens of thousands of beds in the infectious diseases hospitals include 2230 for the treatment of tuberculosis. A large number of voluntary hospitals receive payments from the rates in return for services rendered in connexion with tuberculosis, venereal diseases, maternity, and child welfare schemes. For tuberculosis there are 153, and for venereal diseases 139 hospitals which provide beds as and when they are required, and for maternity and child welfare a dozen hospitals provide 175 beds. In this category there are 127 special tuberculosis hospitals with 8563 beds, 52 maternity institutions with 917 beds, and 12 babies' hospitals with 334 beds. These figures are exclusive of accommodation in homes for unmarried mothers and their babies, observation wards in connexion with maternity and child welfare schemes, and convalescent homes. The Poor-law authorities provide 64 institutions, with 35,250 beds, wholly for the sick, exclusive of institutions for mental cases, and 590 mixed institutions capable of housing 180,000 persons, with 79,000 beds for the sick. If, and when, the councils take over the functions of the boards of guardians, they will thus receive an enormous addition to their public health responsibilities. Meanwhile, these figures add greatly to the strength of the case for the coördination of official health services.

## A GERMAN VIEW OF NICOTINE.

THE third and fourth parts of the seventh volume of "Ergebnisse der gesamten Medizin,"[1] which is appearing in instalments under the general direction of Prof. T. Brugsch, contain articles on subjects as diverse as the diagnosis and treatment of cancer, the radiological diagnosis of gastric and duodenal ulcers, ankylostomiasis, tetany, the nervous child, suggestion and auto-suggestion, and the adrenal blood reactions. In an article on Nicotinism Prof. Heinrich Kionka presents a summary of existing knowledge on the effects of tobacco and their treatment. Nicotine, he states, exists in tobacco in quantity varying from 1 to 3·8 per cent., while in France, where the plants are set wide apart, the percentage may reach 6. Few people, he thinks, realise what a deadly poison this alkaloid is; one drop of the fluid preparation is fatal to a dog and nearly so to a man. Its action on the nerve centres is violent stimulation quickly followed by paralysis; function is accelerated for the time, and unstriped muscle is stimulated by the over-secretion of adrenalin. It is partly this tonic effect that makes tobacco so universally desired, and partly the assistance which it gives to digestion by making all the glands secrete more copiously. The sedative effect he attributes to carbon monoxide rather than to nicotine. This, it is stated, is present in tobacco-smoke in startling quantities, and is the real cause of most of the symptoms of the non-smoker who feels unwell when surrounded by eager devotees in a railway compartment or unventilated room. The reason why nicotine does not do more harm amongst smokers is, of course, that tolerance is easily acquired, and though the beginner shows signs of poisoning at once, he soon becomes immune. Nevertheless, the limits of this tolerance are easily passed, and, according to Prof. Kionka, the inveterate smoker who oversteps the mark suffers far more than the beginner, for his tissues are more or less saturated and he has less resilience. The quantity of nicotine present in tobacco-smoke varies considerably. The content in the leaf is said to be unexpectedly independent of the strength of the tobacco. Whereas with Dixon's apparatus 100 g. of light cigars gave up 1000 mg. of nicotine, compared with 480 mg. yielded by the same weight of strong cigars, two German brands of so-called nicotine-free cigars gave 420 and 320 mg. respectively. The quantity the smoker actually absorbs varies with the capacity of the cigar, cigarette, or pipe for distilling and trapping the nicotine from the burning tobacco. A long pipe is better than a short one, a dry cigar than a damp one, and the first half of any smoke does much less harm than the last. The cigarette, says Prof. Kionka, is the worst of all,

[1] Ergebnisse der gesamten Medizin. Siebenter Band. Berlin und Wien: Urban und Schwarzenberg. 1925.

for its paper covering collects the products of distillation, which are revapourised and absorbed as the cigarette burns down to the end. The smoker who re-lights a pipe or cigar, it is stated, probably absorbs more poison than he would from ten straightforward smokes, whilst chewing and snuff-taking are regarded as not nearly so harmful as smoking, because only a little nicotine is absorbed. There is hardly a single pathological condition, Prof. Kionka says, that tobacco cannot cause or aggravate. It sets up sclerotic and necrotic changes in the heart and large vessels, causes colour-blindness and scotoma, damages the hearing by causing swelling and congestion in the inner ear, and, in specially disposed subjects, will produce a toxic psychosis or any of the minor psychic and nervous troubles that go with cumulative poisoning of the sympathetic system. Like all other habit-forming drugs, he continues, it produces worse effects when it is a psychological factor. The ordinary man smokes because he likes it and cuts down his consumption when he has the familiar symptoms of over-smoking, but the nervous man who uses it to tone his nerves up for brain-work, when he should have learned to control them otherwise, may find himself in a bad way. Provided the poisoning has not continued so long that there are organic changes, says Prof. Kionka, the damage in all cases of chronic nicotinism is largely reparable by stopping all tobacco and purging the system by a course of exercise, baths, and medicine. Iodide of potash is also useful. If nicotine is harmful to adults, he concludes, it is deadly to adolescents, and most civilised countries enforce stringent laws against smoking by young people.

## THE HEALTH OF THE MAORI.

LAST year a series of articles appeared in the *Evening Post* of Wellington, New Zealand, on various aspects of public health activities. These attracted some attention, and the Dominion Department of Health decided to republish them in booklet form under the title of "Striking Facts and Figures" for the information of the general public. The articles are a form of official propaganda and fulfil this purpose well, although unsigned. New Zealand does not appear to admit the claim that to be attractive to the public an article on health must be signed with a famous name. The health of New Zealand has of recent years frequently been held up as an example to other nations. Of the health of the native population little is heard, and it might, perhaps, be thought that this was not so much a subject for pride. Such an idea is, however, shown to be erroneous by the final article which treats of Maori hygiene. Although at first in the hands of the Native Department, in 1901 certain important changes took place, and amongst them was the appointment of Dr. (now Sir Maui) Pomare, the first native graduate in medicine, as medical officer of health under the Health Department. He set in motion at once sanitary reforms among the Maori population which have negatived the pessimistic prediction of the extinction of this fine race. Soon after Dr. Pomare's appointment nine Maori sanitary inspectors began their work, and in 1905 another Maori health officer, Dr. Te Rangi Hiroa, was appointed to assist Dr. Pomare. There are now over 20 native health nurses at work in the more populous Maori districts, lecturing to the women on the feeding of infants, the care of the sick, and other practical matters. Pamphlets in the native language have been prepared on the feeding of infants, tuberculosis, typhoid, influenza, scabies, among other subjects, and there is a good demand for them. Not mentioned in the booklet is the remarkably low death-rate from cancer among the Maori community discovered by Mr. J. W. Butcher in a statistical study to which attention will later be called. Linked up with preventive work is a certain amount of anthropological research. The social and physical improvement that has taken place since 1900 is attributed to the various measures thus briefly set out. Sir Maui Pomare is now Minister of Health in the New Zealand cabinet, Dr. Hiroa is director of Maori hygiene, and the rescue from extinction of one of the finest races in the world substantiates New Zealand's claim to have a sensitive health conscience.

## THE PREVENTION OF POST-MORTEM INFECTIONS.

WE have been sadly reminded in the opening weeks of this year that post-mortem examinations are not without risk to those engaged in this branch of professional work, for two pathologists have recently died as the direct result of infected fingers due to minor injuries received in the course of a routine autopsy. The gravity of the position cannot be correctly gauged from sensational headlines of the lay press in such cases, nor does it seem possible at the moment to arrive at accurate statistical information of the incidence of infections following post-mortem examinations. The Registrar-General rarely reports more than one death per million in any year from all the injuries due to cutting or piercing instruments. In view of the very large number of autopsies performed annually, there can be little doubt that disaster follows in an extremely small proportion of cases. Indeed, this is so well recognised in the profession that a feeling of false security is engendered, and small injuries are regarded of no moment. Even if the accident is recognised as potentially serious, there seems to be uncertainty as to what prophylactic measures should be adopted. Among those who work in the pathological departments of the big metropolitan and provincial hospitals familiarity is apt to breed contempt, and often insufficient care is taken to provide facilities for protection and for prompt and adequate treatment. Moreover, any medical man in practice is liable to be called on to perform an autopsy, though he may have but little experience in the technique. Therefore, we commend to the serious attention of all our readers the analysis of the causes of post-mortem injuries and advice as to their prevention, which forms the subject of this week's article in the Modern Technique in Treatment series.

## MORBID CHANGES IN PELLAGRA.

OPPORTUNITIES for the careful post-mortem examination of the subjects of pellagra are rare in this country. Such an opportunity in the shape of the death of two patients, one suffering from undoubted pellagra and the second a probable case, presenting itself at the Royal Hospital, Edinburgh, has enabled Dr. William Susman, working with a Hoffman Scholarship from the Queen's University, Canada, to make a very full and complete report [1] upon the pathological changes in this condition. Dr. Susman finds the oldest and most pronounced lesions in the thyroid gland which shows proliferation of the vesicular epithelium into the vesicles together with fibrosis and a generalised round-celled infiltration, indicating the spread of a toxic product by the lymphatics. Other organs also showing evidence of irritation by some toxic product are the liver, kidneys, and pancreas. The liver is markedly affected, the irritative process resulting in a fibrosis. In the pancreas the degenerative process affects principally the zymogen cells; the islets of Langerhans are numerous and large, and the cells contain many alpha granules; many of the islets give evidence of damage in the shape of hæmorrhages. The kidneys show peritubular degeneration and fibrosis which, in the opinion of the author, indicates that the causative toxic product is excreted through these organs. The spinal cord shows a degeneration of the dorso-spino-cerebellar tract of a type similar to that described some years ago by Batten and Sandwith. Examination of the fæces by section failed to reveal the presence of amœbæ and presumably, since no mention is made

[1] Edinburgh Medical Journal, February, 1926, p. 58.

of them, of all other varieties of protozoan parasites. No suggestions as to the origin or nature of the toxic product giving rise to the lesions described are hazarded by the author.

## AN INSTITUTE OF BIOCHEMISTRY AT THE MIDDLESEX HOSPITAL.

Mr. S. A. Courtauld has given £30,000 to the Middlesex Hospital for the erection, in connexion with the medical school, of the Courtauld Institute of Biochemistry, and the plans provide for a new seven-storey building to be erected on a site adjacent to the premises of the medical school. The Institute is designed to be a complete department of medical chemistry, where the most recent methods in diagnosis can be considered for application to the patients of the hospital, while the research work will be directed to the elucidation of problems in physiological and pathological chemistry, and the preparation of chemical substances which suggest themselves of value in treatment. Full facilities will be provided for the instruction of students in biochemistry. The new Institute will work in close association with the Bland-Sutton Institute of Pathology. In 1924 Mr. Courtauld endowed the Chair of Anatomy at the Middlesex Hospital Medical School with a sum of £20,000, so that his gifts for medical education and research, apart from donations for hospital maintenance and reconstruction, amount to £50,000. His latest gift is a striking illustration of breadth of vision, for the possible developments of biochemistry as the ally of medicine are of the utmost promise. Clinical medicine is continually annexing subsidiary sciences to help in the elucidation of its problems. The first was anatomy, normal and morbid, the science of direct observation of the gross structure of the body. This was followed by the study of function in health and disease, and still later the fruits of microscopical observation were enlisted. To-day exact information as to the chemistry, not only of natural products but of physiological and pathological processes, is felt to be the great need of modern medicine. Biochemistry has become so wide as to need subdivision, with the result that while some laboratories work only on abstract problems with no direct clinical or commercial application, others are devoted to the study of physiological processes. A comparatively small body of workers in this country are attacking the clinical applications of biochemistry, and these for the most part are clinicians with special scientific attainments rather than chemists profoundly interested in medicine. Mr. Courtauld's generous gift is intended to found an Institute embracing all branches of biochemistry, but with a general trend towards the study of clinical conditions. Since the new Institute will be responsible for all the chemical routine work of the hospital, the workers will be in intimate touch with the patients. Under the direction of Prof. E. C. Dodds there is little fear that the therapeutic aspect of the work will be neglected, for he has long given practical proofs of his interest in the clinical application of his researches. All branches of biochemistry will be studied in the new Institute—the pure chemistry of natural products, physiological and pathological chemistry, together with the routine work. In addition to clinical facilities, the workers will have the benefit of collaboration with the Bland-Sutton Institute of Pathology, and it is proposed that chemotherapeutic researches shall be started by the two departments working in close association.

KING EDWARD'S HOSPITAL FUND FOR LONDON.—Hospitals desiring to receive grants from this Fund for 1926 must make application before March 31st to the hon. secretaries of the Fund, 7, Walbrook, E.C. 4. Such hospitals must be in the county of London or within 11 miles of St. Paul's. Applications will also be considered from convalescent homes which are situated within these boundaries or which take a large proportion of patients from London.

# Modern Technique in Treatment.

*A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.*

## CLXIV.—THE TREATMENT OF POST-MORTEM INFECTIONS.

POST-MORTEM injuries are usually trivial: it is rarely that a wound of any considerable size is seen. They may be punctures, scratches, or incised wounds, and occur most frequently in the terminal segments of the left index and middle finger, and on the ulnar border and the posterior surface of the forearms and hands. It is instructive to analyse how these post-mortem injuries usually occur.

The *puncture wounds* of the left index and middle fingers may be produced by a prick of the knife point, and appear to happen principally during (1) the removal of the tongue and fauces from the mouth through the mid-line incision in the neck; (2) the mobilisation of the liver and its separation from the diaphragm; (3) the en bloc removal of the contents of the pelvis. They may occur also during the investigation of some morbid condition involving bone—e.g., an aneurysm of the arch of the aorta eroding the bodies of the dorsal vertebræ, a chronic bone infection, or a growth of bone. Small spicules may be lying loose in a cavity or may project from the surface, and being unpleasantly sharp may have punctured the finger before any danger is anticipated. Similarly, the finger may be pricked by the jagged edges of carious teeth.

There is another way in which the knife may cause trouble. While the viscera are still in situ but exposed, an occasion sometimes arises when both hands are needed (e.g., the stripping of an adherent pleura to mobilise the lung) and the knife is placed, not on the table, but among the intestines, between the coils of which it sinks to ambush. Later comes the exploration of the abdominal contents and the knife recalls its existence by stabbing the examining finger. Few pathologists will admit that they have been guilty of such wanton carelessness, but many declare that they have seen other workers lose sight of a knife in this way.

Pricks from needles are rarely seen among post-mortem workers, who use needles almost exclusively for suturing the skin incision, and employ large, easily handled ones. Yet I am informed that pricks of the two fingers do occur, possibly because by that time the interest of the case has lapsed, and the suturing is an irksome task to be completed as soon as may be. The post-mortem operator—unlike his surgical colleague—does not use dissecting forceps to assist his suturing, but steadies the skin with the fingers of his left hand, and it is thus easy to understand how a tired worker may inadvertently prick his finger. A curious example of needle injury, from which no untoward consequence resulted, is that suffered by a pathologist during an autopsy on a man who had died on the operating table. Amongst other restoratives applied had been direct injection of a stimulant into the heart, during which process the needle was snapped off short in the body; at the autopsy the pathologist pricked his finger on the buried fragment.

*Scratches* are produced mainly in one way. The thorax cavity is exposed by dividing the costal cartilages on each side near the costo-chondral junction, or the ribs are sawn through further out. Often adherent lungs demand the introduction of the hand and forearm into the thoracic cavity, and it is during this manœuvre that the skin is liable to be scratched by the projecting ribs or rib cartilages.

*Incised wounds* by the knife are rare and can generally be avoided by the experienced worker.

*Surgical Injuries.*—Injuries received during the course of a surgical operation are in many ways similar to the post-mortem ones. They are inflicted by knives, needles, and bone spicules, and are probably

far commoner than in the post-mortem room, but so many operation cases are "clean" ones, and the surgeon's hands have been so thoroughly prepared, that the probabilities of infections following are greatly diminished. Nevertheless, they should be treated with the same respect, and the whole process of prophylactic treatment gone through, for it is not always possible to decide when an operation case is infected or not.

*Bacteriology.*—The vast majority of causative organisms in these conditions are the pyogenic cocci. Theoretically there are many others, but actually few cases will be seen that are the result of anything but staphylococci or streptococci, and of these the latter is infinitely the more serious. The fulminating types of lymphangitis are a virulent streptococcal infection, and though a staphylococcus may give widespread and dangerous trouble locally, it rarely gives a septicæmia unless the treatment has been grossly at fault. It is worth taking a swab when a septic finger or hand is opened, for it does help to form some idea of the prognosis of the case, and, moreover, an autogenous vaccine may be prepared for use if it is thought desirable.

### *The Prevention of Injury.*

Methods of preventing accidental injuries fall into three groups: (1) adequate protection, (2) proper technique, and (3) reasonable care.

*Adequate protection* is essentially a matter of suitable clothing. Even in big institutions protection is often insufficient, and among those who do only occasional autopsies the main idea often is to safeguard the clothes and not the skin. The proper apparel is as follows: First a mackintosh; over this a long-sleeved overall with elastic bands at the cuffs. The ordinary type of operating gown serves admirably, and, in fact, in many hospitals pathologists' overalls are made to the same pattern, but of a different coloured material to avoid confusion at the laundry. Next, gloves must be worn; a totally unjustifiable risk is run if they are omitted. They should be of the gauntlet type, and the best variety is that which combines fine roughened hands with coarse rubber for the forearm extension, which should reach nearly to the elbow; further, the cuffs of the gown must fit snugly to the gloves at the wrist. A pair of cotton gloves over the rubber ones are useful protectives, for surgery on the living has taught us how consistently these deflect spicules of bone and so prevent the perforation of the rubber beneath. In this way the sense of touch is not too seriously impaired, while adequate protection is ensured.

*Technique.*—The surgeon develops a well-devised technique from long experience, his main object being to preserve the safety of the patient. The post-mortem subject having passed beyond the need of such care, the operator should consider his own safety. It would be out of place here to dwell on the methods of conducting a post-mortem examination, and I will consider the technique only as far as the handling of instruments is concerned. Surgeons visiting the post-mortem room are often amazed at the casual way of the pathologist with his instruments. These are usually to be seen on the table beside the body, probably to end by slithering into the groove between table and body, where in due course they will be covered by some of the removed viscera. Attention has already been directed to the habit of laying knives on the body. As so very few instruments are needed a very simple working scheme should suffice. A small table, comparable to a bed table, astride the body, with sufficient clearance to avoid the thighs, might be used for instruments. Similarly, during the examination of the removed viscera an instrument tray should be used. Mention has been made of the part played by the divided ribs or costal cartilages in scratching hands and forearms. The method usually adopted is to fold the musculo-cutaneous flap raised from the sternum and chest wall over the projecting ribs so that these are hidden from view. It seems that in many cases the division of the costal cartilages cramps the worker for room rather seriously, and it would probably be much wiser to saw the ribs through further out as a routine procedure. Lastly, to avoid needle pricks during sewing up, dissecting forceps should be used. It may be said that to those without constant practice suturing already takes a long time; but after all, the pathologist has only to sew up reasonably neatly and he need not bother about accurate co-aptation or inversion of the edges. In most big hospitals the skin suture is done by the post-mortem attendant with dexterity and speed, but without great care. These unqualified assistants are specially apt to hurry through this work; the use of dissecting forceps should be taught and practised as a routine measure by everyone in the pathological department.

*Reasonable Care.*—It is in the absence of a living patient who will suffer from error that carelessness is so apt to take root, and it is often the man with a fair amount of experience who errs the most—the novice being far too anxiously concentrated on the work in hand. We have all seen the reflection of the musculo-cutaneous flap continued with bold sweeps of a knife while the manipulator looks aside to answer questions or to dictate notes. The subject may be beyond injury, but the pathologist's fingers are not. Incidentally the clinical honorary staff are sometimes guilty of urging the performance of an autopsy at an unusual time when the pathologist has other duties, or of attempting to hurry the progress of a dull case belonging to someone else in order to witness the examination of a supremely interesting one of their own. The code of the operating theatre or, indeed, of the navigation bridge, might with advantage be more closely followed in the post-mortem room. Some pathologists aver that as time goes on they and their assistants probably develop a natural immunity, and it has even been suggested that those who get slight septic infections in their early days of post-mortem work are fortunate in that they are raising an effective barrier against later and possibly more serious trouble. This is an attractive theory, but is hardly susceptible of proof, and few would recommend attempts to immunise beginners in this dangerous way.

### *The Prophylactic Treatment of an Injury.*

The problem before us is the selection of the exact procedure to be adopted when a finger is pricked or cut or the forearm is scratched during post-mortem work. The desirability of the immediate adoption of such drastic measures as amputation or excision of the wound have recently been discussed. I find it difficult to choose words emphatic enough to condemn panic amputation. If we consider how small is the number of severe infections following post-mortem injuries and how rarely does a fatal issue follow or a serious deformity result, we must conclude that hasty amputation, which must bring with it great disability, is never justifiable. Such advice would imply that an infected finger means probable death or disablement, for on no other grounds could a crippling operation be justified. Fatalities may result either from the fulminating type of lymphangitis—fortunately rare—or because the early treatment of the infected finger is inadequate, but their occasional incidence should not be allowed to induce such a pessimistic outlook as to interfere with a sense of proportion.

The question of the excision of the wound has also been raised. I do not advise excision for the following reasons. Needle pricks and knife punctures are very small and, in fact, can often not be recognised unless bleeding, and the area in question may therefore be too ill-defined to excise. Secondly, the pulp of the finger has none too much tissue to spare; if excision were performed, a painful scar in the tactile part of the finger would often result. In the presence of scratches of the superficial epidermis, to think of an excision, which entails the opening up of the subcutaneous tissue and often an extensive sutured wound, is surely inadmissible. When the wound is an incised one of some size and depth on the forearm or the

dorsum of the hand, then I have nothing to say against excision, except that I consider it unnecessarily severe, for it must be remembered that post-mortem wounds of this sort are regular incised wounds without any severe laceration or damage to the underlying tissues. The problem is not quite the same as that of the war injuries, where we had to deal with damaged and devitalised muscle which directly encouraged sepsis. Finally, I believe that post-mortem injuries can be effectively sterilised without such drastic methods.

The steps to be taken in these cases are as follows: (1) cease work at once; (2) encourage bleeding; (3) cleanse the wound thoroughly; (4) immerse the wound in an iodine bath; (5) put on a sterile dressing; (6) give suitable drugs; (7) immobilise the arm.

1. *Cease work* obviously means that work should be instantaneously abandoned and handed over to someone else; should there be no one available the whole routine of the treatment should be gone through (except immobilisation), and the examination finished as quickly as possible, with a fresh glove over the injured part.

2. *Encourage Bleeding.*—Generally the immediate concern of the subject of the injury and of the onlookers is to stop the bleeding. This instinct is not to be followed. Bleeding—especially slow welling-up from the depth of the wound—will wash out infecting organisms quicker than anything else. The wound, if not bleeding, must be made to bleed, and the best way to do this is to use the arm compressor of a sphygmomanometer and to blow it up till passive congestion is obtained. If it is blown up until the radial pulse disappears and air released until the pulse is again perceptible, the right amount of pressure will have been secured. The bleeding should be allowed to continue for two and a half minutes by the clock and then, the arm band having been removed, the next stage should be proceeded with.

3. *Thorough Cleansing of the Wound.*—When discussing the treatment of injuries to the hands of industrial workers I have always deprecated washing or scrubbing the part, for this reason. Their hands, from the nature of their work, are very dirty, and scrubbing only means the introduction of more dirt into the wound; the hands of post-mortem workers may be stained with dyes but are otherwise clean, and there is a minimum of infection around the wound. These injured fingers or hands should therefore be scrubbed with a sterile nail-brush and ether soap. The part is then dried with a clean towel and immersed in the iodine bath.

4. *Iodine Bath.*—By this I do not mean the usual drachm to the pint solution used in the treatment of established infections, but that the injured part must be *immersed* in an alcoholic tincture of iodine and kept there for *five* minutes by the clock. The edges must be separated so that the iodine penetrates to the depths. The evidence in favour of iodine as a prophylactic is overwhelming as the statistics of Kanavel and of Mock show. Its value is proved by its use in thousands of industrial concerns all the world over, and it is one of the components of the army first field dressing. But it must be used properly and lavishly. I know nothing more futile than the custom of dabbing a small amount of tincture of iodine on to a cut with a swab.

5. *The Sterile Dressing.*—A sterile or antiseptic dressing is now applied with a generous amount of wool, and the greatest care must be taken to ensure that the bandage is not so tight as to impede the flow of blood through the injured area.

6. *Drugs.*—Of the value of manganese I am convinced. Manganese butyrate should be given in 1 per cent. solution as a 1 c.cm. injection into the muscles of the buttock. Prof. L. S. Dudgeon reports favourably (see THE LANCET, Jan. 23rd, p. 169) on the intravenous use of mercurochrome.

7. *Immobilisation of the Arm.*—The value of the immobilisation of an injured area to allow the natural defences of the body full scope for their efforts to localise the infection is obvious. The arm should be placed on an internal angular splint which must reach beyond the tips of the fingers and is comfortably fixed with wool and bandages. The remainder of the day ought to be spent quietly at home and to be followed by a long night in bed. The splint may be removed on the next day and the hand carried in a sling till 36 hours have elapsed. Finally, if the least swelling, throbbing, or pain at the site of injury occur a surgical opinion should be obtained without delay.

*Treatment of an Established Infection.*

It may be that a prick is so slight as to have escaped notice, or that infection has supervened in spite of energetic prophylaxis. In an article on Infections of the Hand, which previously appeared in this series,[1] I have summarised the differential diagnosis and treatment of the various forms of sepsis that may arise from injuries to the finger. Briefly, to recapitulate, the inflammatory process may take the following forms: (1) acute lymphangitis; (2) infection of the terminal segment of the fingers; (3) acute tenosynovitis; and (4) infection of the fascial spaces in the palm.

The treatment of septic conditions other than lymphangitis resolves itself into proper incision and drainage; when this is adequate healing results, when it is neglected nothing else can help the patient. Whereas lymphangitis is at first an infection of a few lymphatic vessels and tends to remain localised, spreading only by continuity up these normal paths, if the area is incised numbers of healthy lymphatics are opened up and infected, the total area of inflammation being vastly increased. For the same reason cuts across the advancing red lines are to be condemned. For these reasons, though differential diagnosis between all these conditions named is of great importance, the first and fundamental distinction to be made is that between acute lymphangitis and any of the others. I will therefore first briefly recall the principles of the differential diagnosis and treatment of the septic conditions other than lymphangitis and then discuss at greater length the best ways of coping with this dangerous condition.

1. *Infection of the Terminal Segment of the Finger.*—A sensation of soreness, possibly of pricking in the finger-end, and that night a throbbing pain of increasing severity, is a common history. On the following morning there is a red, tense, shining, very swollen and tender finger-end. There is an absence of severe constitutional symptoms, and of typical red lines in the forearm. Treatment should consist in one or, if necessary, two lateral incisions, or a horse-shoe incision formed by uniting the two lateral cuts, which should not extend upwards as far as the distal finger crease, by one over the tip of the finger, a quarter of an inch in front of the nail.

2. *Infection of the tendon sheath* can arise (*a*) directly from a gross crushing injury, (*b*) following on a pulp infection. The latter only need concern us here. Kanavel gives as the cardinal signs of infection of the tendon sheath: (1) Exquisite tenderness over the entire course of the sheath. (2) Symmetrical enlargement of the entire finger. (3) Excruciating pain on complete extension of the finger, most marked at the proximal end. (4) Moderate flexion of the finger. In addition the bases of the two adjacent fingers are swollen, and the dorsum of the hand is highly œdematous. The whole hand is somewhat tender, but even the slightest pressure over the sheath gives intolerable pain. The trouble may extend to the bursæ in infections of the little finger and the thumb. A raised temperature and rigors may be present, but the local signs will serve to distinguish the infection from primary acute lymphangitis. Treatment consists in lateral incisions of which the exact position, extent, and direction cannot here be defined, but it may be said that they are more often too small than too large.

3. *Infection of the Fascial Spaces of the Palm.*—Fascial space abscesses are usually secondary to infection elsewhere in the hand. The temperature is likely to be high and the general condition bad. Pain over the area, not so accurately limited as in acute tenosynovitis, tenderness, and local swelling, are present. In infection of the middle palmar space the dense fascia does not allow of much swelling, but the normal concavity of the palm may be rendered convex. Treatment is the drainage of the spaces through

[1] THE LANCET, 1924, i., 966.

the canals of the appropriate lumbrical muscles, the incisions extending from the web, distally, as far as the middle flexion crease, but not beyond.

4. *Pus Spreading to the Forearm.*—Pus may track from hand to forearm either by rupturing out of the upper limits of the synovial bursæ or along the upward prolongation of the middle palmar space. The result is the same, for both routes lead to the plane between the superficial flexor mass and the deep flexors with the pronator quadratus. From here pus can track laterally to reach the ulnar and radial borders of the forearm immediately anterior to the bones, or upwards along the same plane towards the elbow. It is therefore clear that the only method of draining such an extension is by lateral incisions parallel to and immediately anterior to the plane of the bones. Severe cases will demand an incision on each lateral border; no other approach provides adequate drainage.

The brief statements as to treatment must not be taken to imply more than the general lines which a surgeon of experience will follow. In the article already referred to I have given more details, but those who wish to equip themselves to treat infections of the finger and hand are advised to study Prof. A. B. Kanavel's masterly work on the subject.[2] I would here only point out the need of a general anæsthetic (gas and oxygen) for every operation; the desirability of operating in a bloodless area, using the arm compressor of a sphygmomanometer first as a tourniquet and later to induce passive congestion; and the advantages of using wicks of rubber tissue for drainage. No incision should be made before the exact anatomical position of the pus has been determined, and though swelling of the dorsum of the hand may be, and usually is, prominent, incisions should not be made there until every other possible site has been excluded. After-treatment should consist of fomentation for 72 hours, followed by light dry dressings and hot, dry air baths. Early active movements of the fingers should be encouraged.

*Acute Lymphangitis.*

It is this dangerous condition which, from the very fact that no drastic surgical treatment is called for, gives rise to some of the most perplexing problems of therapeutics. It is essentially an infection of the lymphatics, with little or no extra lymphatic local infection at the primary site, though at a later date a local abscess may form at the site of infection. The process spreads rapidly through the normal lymphatic channels up the forearm, into the axillary glands, and later in severe cases into the general blood stream. A slight injury to a finger may be followed by a slight feeling of tense discomfort without the typical throbbing of an infected pulp; on examination there is no appreciable local swelling. A feeling of chill or even occasionally a rigor may have occurred. The red lines of lymphangitis will be visible in the forearm and grave constitutional symptoms will be present. Kanavel has described four types of acute lymphangitis:—

1. Acute lymphangitis, without local complications. Here the symptoms are as described above with red lines and a temperature of 103° F., and a general feeling of severe malaise. Treatment produces a dramatic change, and within a few hours the condition is relieved. (2) A similar condition which clears up quickly, but leaves behind a small local abscess at the site of infection. (3) Acute lymphangitis, with systemic involvement and associated with severe secondary tendon-sheath infections. (4) Acute lymphangitis, with severe systemic involvement.

These last may be of the fulminating type, rapidly flooding the patient with an acute septicæmia followed by a fatal result in a few hours or days. These cases constitute one of the tragic disasters of surgery. Other cases, though not fatal, exercise the skill, patience, and lasting power of the medical attendant to the utmost. They rapidly become seriously ill with a maintained high temperature, rigors, wasting, and a reduction of resistance to the lowest ebb; but with energetic treatment they will mostly pull through.

[2] Infections of the Hand. Lea and Febiger. Fifth edition. 1925.

The treatment of acute lymphangitis must be local and general. The local treatment consists in swathing the hand, forearm, and arm in an old-fashioned poultice, for fomentations lose their heat too rapidly. Only in the presence of well-defined complications, such as localised abscesses or teno-synovitis, is active surgical intervention called for. It cannot be too strongly emphasised that incisions for lymphangitis do no good. Indeed, as is pointed out above, they do harm in increasing the area for absorption.

The general treatment is confined to eliminative and supportive methods. Absolute rest and quiet, saline purgatives, diuretics, and stimulants all have their place. Antistreptococcal serum in large doses has been used without very encouraging results. However, I have found blood transfusion a weapon of the utmost value in combating septicæmia, and recommend that the grouping of available donors should be undertaken at the first threat of a serious infection, one being kept always at hand till the acute stage is past. Metastatic collections of pus must be watched for and the danger of an empyema borne in mind

R. M. HANDFIELD-JONES, M.S. Lond., F.R.C.S. Eng.,
Assistant Director, Surgical Unit, St. Mary's Hospital.

# Special Articles.

## LIVERPOOL CANCER RESEARCH COMMITTEE.

THE following memorandum has been sent to THE LANCET for publication:—

It may be held to be wise to ignore criticisms that have no basis in fact. Nevertheless, the spread of adverse criticism creates rumours, and from our war-time experience we know how damaging rumour may be both to morale and to the pursuit of proper procedures. For this reason we consider it expedient to inform the medical profession of the truth of certain matters concerning which grave and unjustifiable charges have been made. These charges are of two kinds.

1. It has been stated that some great secret has been withheld from publication—that is to say, the method of preparation of the material used has not been disclosed. Now, in spite of the fact that Prof. Blair Bell would have been absolutely justified, and would have received the entire support of this Committee in withholding publication on this matter in view of the manifold difficulties of manufacture and the dangers of usage, as so ably explained by Prof. Carter Wood in THE LANCET (Feb. 20th, 1926, p. 414), in point of fact this course has not been adopted. So long ago as February, 1924, Prof. Blair Bell described and discussed the method of preparation of colloidal lead. Since that time many variations have been employed, but the general method has remained the same. The dosage and all the dangers and difficulties have likewise been published. Finality, however, has not even yet been reached. The very fact that the general body of practitioners appears to be ready to use the material if it be distributed without control, to the possible disparagement of the method and serious risk to the public, has impelled the Committee recently to protect the method of manufacture, as was done in the case of insulin.

2. With the dissemination of such erroneous ideas, it became inevitable that many would charge Prof. Blair Bell with "making hay while the sun shines," and say that he is keeping the treatment in his own hands, is exacting exorbitant fees, and is rapidly amassing a fortune by the employment of what to all intents and purposes they assert is a secret remedy. This charge is wholly contrary to the truth.

The Liverpool Cancer Research Committee have evidence that during the first five years 75 per cent.

of the 200 odd patients treated were virtually charity patients, some few paying a nominal fee for accommodation, the majority being treated free of all cost. In other words, during the first five years since the initiation of the treatment Prof. Blair Bell has received remuneration from at most 75 patients—that is, an average of 15 each year. Nor, considering the benefit conferred, can the remuneration be regarded as other than most moderate.

Feeling acutely the charges circulated against him—often by men he had regarded as friends—at the end of four years a cheque for the whole amount charged for treatment was sent by him to the Cancer Research Committee. This cheque the Committee refused to accept. At the end of last year, on his return from America, when, for the first time, there was a large influx of patients, Prof. Blair Bell approached the Cancer Committee again asking them to receive all the fees for treatment, at the same time becoming themselves responsible for all necessary expenses. Knowing how gravely his intense preoccupation with cancer had interfered with his gynæcological practice, the Committee would not consider this offer. They made the counter offer, which has been accepted, that for his services as Director he should, from Dec. 1st, 1925, receive a stipend like the rest of the staff. In return the Committee assume all responsibilities for the housing and maintenance of the cancer patients under Prof. Blair Bell and the clinical staff; they receive all the fees and place all the books detailing income and expenditure under the weekly supervision of a well-known accountant. They have taken under their control the nursing home previously occupied by Prof. Blair Bell's gynæcological cases and have, in addition, bought and furnished another. Out of the moneys received they are continuing the stipends of those of the staff engaged in research, and are enlarging that staff, and they have by resolution agreed that all moneys over and above those expended as aforesaid shall be devoted to the furtherance of medical research.

We may add that these arrangements have been submitted to the President of the General Medical Council and have received his personal approval. Further, to secure their position, the question of incorporation is being considered by the Committee.

It is felt by all engaged in this work that, if it can be generally known that Prof. Blair Bell and the clinical staff are not benefiting to any unusual degree by this work, but are by their labours supporting the entire burden of the laboratories and clinical organisations, there may be greater confidence in, and greater sympathy with, what promises to develop into a very wonderful advance in the treatment of a most terrible state.

We enclose a copy of the circular letter which has been drawn up and sent by the Director to all doctors who have written to ask for treatment for their patients.

Signed, on behalf of the Liverpool Cancer Research Committee,

J. A. SMITH, Chairman.

REX D. COHEN, Treasurer.

Liverpool, Feb. 23rd, 1926. J. GEORGE ADAMI.

[ENCLOSURE.]

DEAR SIR,—Thank you for your letter. You will understand that we are engaged in a scientific investigation, and have regarded our clinical work as a test of the findings obtained in the laboratory. We do not pretend and never have pretended that we have a "cure for cancer." Nevertheless, the ultimate aim of all such work is that, and we are prepared to take suitable cases that can come for consultation in the first instance, provided they are fully informed:—

1. That consultations are arranged in order that it may be determined whether the case is suitable for further investigation. A consultation does not mean that, *ipso facto*, the patient will be taken for treatment.
2. That the treatment itself may be dangerous.
3. That the treatment is experimental in nature.
4. That there is no guarantee whatsoever as to the result.
5. That patients must, if they come, place themselves unreservedly in our hands, and continue the treatment so long as we think it advisable.
6. That accessory treatment, such as X rays and operation, may be necessary.
7. That, if an operation has been performed, a section must be sent in advance.
8. That *all* fees are handed over to the Cancer Research Committee.

Yours very truly,

W. BLAIR BELL, Director.

## MEDICINE AND THE LAW.

### MORE ACTIONS AGAINST DOCTORS.

IN addition to the action for negligence brought by Mrs. Venn against Dr. Todesco and Dr. Elder (discussed in a leading article on p. 560) two other actions against doctors were heard recently in the law-courts. In one of them Mrs. Norris claimed damages against Dr. W. A. MacWilliam, of Norbury, for alleged breach of contract and for personal injury, said to be due to his negligence in treating her at childbirth. She also claimed £430 special damage. The defendant denied the negligence and counterclaimed for his unpaid fees. The case presented no new point of general principle. After a careful hearing before the Lord Chief Justice it fortunately reached a final decision, Dr. MacWilliam succeeding at all points.

The second case was one of greater difficulty and less finality. The facts, as stated in the *Times* report, were these. An ex-officer, Captain F. Hume-Spry, late R.F.A., was invalided out of the Army in 1917. Suffering from neurasthenia he was examined on behalf of the Ministry of Pensions in 1920, and entered one of the Ministry's hospitals. He passed through other hospitals and in 1923 went to Latchmere. Two months later a medical certificate was signed for a reception order under the Lunacy Act, and he was removed to the Old Manor Asylum, where he remained under a second certificate. Later he left the asylum, a doctor having certified that there was sufficient cause to release him. He then began two actions, one against the doctors who had certified him for removal and retention, the other against his wife and other persons for conspiracy. Prima facie these proceedings against the doctors were blocked by Section 330 of the Lunacy Act of 1890, if they had acted in good faith and with reasonable care. Under the usual legal machinery in chambers the action was stayed. The plaintiff appealed to Mr. Justice Bateson, who confirmed the order staying the proceedings, but granted leave to appeal further. The Court of Appeal reversed the order and directed that the action should proceed. Under the statute the sole question for the judges at this stage was whether or not they were "satisfied that there is no reasonable ground for alleging want of good faith or reasonable care." It was perfectly clear that the judges could not be thus satisfied, for the plaintiff was able to produce affidavits sworn by medical practitioners testifying to the contrary. "It might be said," observed Lord Justice Bankes, "that it was rather surprising to find a body of medical men who could come forward and say of others that they had not only acted without reasonable care, but also with want of good faith; but in this case there were two medical men who had come and pledged their oath upon both points." The court could not disregard such testimony; the case must go to a jury. The learned judge was careful to say that he expressed no view on the merits of the case, nor whether the affidavits contained opinions which a jury was likely to accept.

### PROFESSIONAL SECRECY AND THE DANGEROUS DRUGS ACT.

The recent prosecution of Dr. George C. Kingsbury, for supplying morphine contrary to the Dangerous Drugs Act, raised important professional issues. Counsel for the prosecution made it clear that not the slightest reflection was made upon the defendant's personal honour; the case was one, however, of much more than personal interest. The facts seem to have been undisputed. Dr. Kingsbury, having moved from the North of England to London, and having become

a barrister-at-law, no longer carried on a general medical practice, but occasionally saw some of his old patients in a friendly way. Amongst these were two morphine addicts. One of them, a woman, he succeeded in curing. The other, a man of 70, he was treating, by the method of gradual withdrawal, with good prospect of success. Dr. Kingsbury purchased a supply of morphine from a chemist for a period of a year or more and personally handed the tablets to the patient whom he was treating gratuitously. The prosecution said that the doctor must keep a register in the prescribed form or else a day-book containing the patient's name and address. Dr. Kingsbury refused to disclose this information. He contended that a consulting physician in personal charge of a case is not obliged to keep any record; he added that thousands of doctors were never asked to keep these registers and never would. The magistrate treated the prosecution as a test case, convicted the defendant, and imposed what was euphemistically called the nominal penalty of 25 guineas. Dr. Kingsbury intimated that he would ask for a case to be stated with a view to appeal.

The Home Office, it appears, is seeking to ascertain how far it can go under its present powers. After studying the report of the recent Departmental Committee on Morphine and Heroin Addiction, one certainly retains an impression that the circumstances of Dr. Kingsbury's case were therein recognised as not wholly covered by existing legislation. If this be so, it seems undesirable that so big an issue should be dealt with by pressing prosecutions under the present law rather than by asking Parliament to pronounce afresh.

On the all-important question of the confidential relations between doctor and client the recent report had something to say. It recognised the disadvantages of impairing those relations. It observed that public opinion and the legislature have in some instances regarded the interests of the community and of the patients themselves as outweighing the interests of professional secrecy; but the report added that "each proposal for extension of this principle to a new group of cases must be considered on its merits." With this recommendation the medical profession would probably be prepared to agree, provided that the proposals are to be considered by public opinion and Parliament rather than by the police-court.

## VIENNA.

(FROM OUR OWN CORRESPONDENT.)

### *The Problem of the Expatriated Practitioner.*

EVER since the end of the war there has been serious trouble over the nationality of people born in the non-Austrian States of the old Empire, who have taken up their abode in what is now called the Austrian Republic. The right to practise medicine here is limited to Austrian subjects, but the various peace treaties have assigned many practitioners to other countries—countries whose language they may not even know. Being unfamiliar with its customs and people they have no desire to get to their native land, although—mainly for military reasons—their countries claim them. Out of about 5900 practitioners fully 27 per cent. are not Austrian born, whilst in Vienna itself the proportion of doctors technically not Austrians reaches about 39 per cent. It would be utter ruin for them to be uprooted and to leave Austria, or to lose the right to practise here. The Ministry of Home Affairs has accordingly decided to nationalise unconditionally all persons born in the former Austrian Empire who were in practice here before 1920. Other "aliens" must apply for nationalisation, and their applications will be considered in a most liberal sense. The Government has also begun negotiations, now nearly complete, for obtaining full reciprocity in this respect with all the seceding States, especially as regards the frontier cities and health resorts.

### *Fees between Medical Men.*

The Vienna Medical Council has repeatedly considered the relations between medical men who render one another medical assistance. It was understood, of course, in older, better times that such services were gratuitous, but now, with changed conditions, the views of the majority of doctors have changed also. It must be said that under the old system the doctor and his family were for the most part worse off than private individuals, who in case of illness could summon the family physician as often as they thought fit. The medical man, on the contrary, could not bother his doctor too much because the service was gratuitous, and many a necessary call was never made because of these scruples. More than two years ago suggestions were made in the German (Austrian) medical papers by a number of practitioners who wanted a ruling on these questions, and at a recent meeting of the Medical Council a resolution was presented and adopted, to the effect that every service requires adequate payment and that medical men and their families should be treated on the same principles as other private patients. It was suggested that, for the time being, the profession should accept the following proposals: (1) Every medical man who is offered a fee for the treatment of a medical man or the family (wife, children) dependent on him for their upkeep is bound to accept it and to hand it over in a tactful way to the funds of a medical or other charitable institution or to the Medical Organisation. (2) Such fees shall be offered at a scale not exceeding that arranged between the Organisation and the sickness club of the Civil Service men. These provisions, it is hoped, will remove the qualms of patient and practitioner. They will also suit the patient's pocket, for the fees are only about one-third of those paid by private patients, and though the doctor is bound to accept an offered fee, he does not ask one. These arrangements are, as stated above, only temporary. There is some question whether it would not ultimately be more convenient to have a central clearing office, so to say, for the payments, so as to do away with the awkwardness—to some doctors, at least—of offering fees to a colleague. It is intended that funds from this source shall be used to ensure better nursing for medical men requiring treatment in hospitals or nursing homes. Definite regulations will be suggested after the present scheme has been tried for one or two years.

### *The Title of "Specialist."*

In conformity with the views held by the large majority of medical men, it has been decided by the Organisation that a doctor may not style himself specialist and become a member of the officially recognised Association of Specialists until he has fulfilled certain requirements. These are: Qualification as M.D.; three years' study in a hospital or clinic devoted only to the specialty selected (which must include at least one year's service as house surgeon or house physician); and another year as resident or junior surgeon or physician in a general hospital. This means that a specialist has seen four years' hospital work before he becomes a fully-fledged member of the Association and gains the right to settle down in practice. Difficulties have now arisen over doctors who are in practice already or are in the act of taking it up, but have not had that kind of elaborate preparation. In order to regularise their position it has been decided that doctors who graduated before Jan. 1st, 1923, and have had at least two years' specialist training may apply for membership of the Association of Specialists. Those who have been in specialist practice for two years or more are exempt from all restriction.

### *Fewer School-children and Fewer Males.*

The census of school-children in December, 1925, has shown that the total number of pupils in all schools from 6 to 18 years of age is 61,060 less than last year. Statistics of the Board of Health of Vienna

show that to-day we have 200,288 children in the age-period up to 10 years, whereas in 1914 the corresponding number was 330,885. In other words, that age-group which represents the coming generation shows a drop of 30 per cent., and this fall will be the more marked when the present generation gradually dies out. Furthermore, in 1914 the relative number of males to females was 1000 : 1077. At present it is 1000 : 1254—i.e., there is a surplus of females of over 25 per cent., and this is likely to increase still further since amongst children up to 15 years the disparity is even greater. It means that in ten years no less than 30 per cent. of the Viennese women will be doomed to celibacy, and as the population of the city is even less than in 1910 (the loss is 165,641, or over 10 per cent.), the birth-rate is not likely to reach a high level.

## CANADA.

(FROM AN OCCASIONAL CORRESPONDENT.)

### *Proposed Hospital Tax for Montreal.*

THE hospitals of Montreal are in financial difficulties, and it is obvious that their cost will increase rather than diminish as time goes on. At present they are maintained chiefly by the donations of a comparatively small group of citizens, and there is an increasing feeling that this is a bad arrangement. Paying patients in the public wards do not contribute to the cost of their maintenance, and thousands of in-patients are housed, fed, and treated gratuitously. The grants given by provincial and municipal governments are very small. Recently it has been proposed that a tax should be levied to meet the annual deficits of the hospitals. This proposal has been generally endorsed by the citizens, and the only question now to be answered is: What is to be taxed? Luxury taxes on motor-cars and liquor sales have been suggested, but it is objected that motor-cars are not luxuries—though few have the hardihood to say the same of liquor. A tax on motor-cars might be equitably distributed, it is thought, over the holders of motor-car licences, upon a graded scale varying from 1*d.* a week on cars costing £200 or less, up to 3*d.* a week upon more expensive cars. Liquor is under State control in the Province of Quebec, and a substantial portion of the revenue from a liquor tax would be collected from the travelling public who freely patronise the Government stores. A small tax on these people would be no hardship. The form which the taxation shall take is a matter for discussion, but it is encouraging to see how cordially the proposal has been received by the community at large. Perhaps a way out of the difficulties of the hospital situation may really have been found.

### *The Birth-rate in English-Speaking Canada.*

The birth-rate in English-speaking Canada continues to decline. In June last, the most recent month for which the record in the Bureau of Statistics is complete, 12,396 babies were born in eight provinces, whereas in June, 1924, 13,344 infants were born in the same area, and in June, 1921, 13,960. (These statistics do not include stillbirths, of which there were 427 last June.) During the past four years, it is stated, the birth-rate for all Canada, exclusive of Quebec, has dropped from 26·5 per 1000 of population to 22·1. Maternal mortality, however, is also diminishing. In June, 1925, it amounted to 5·5 per 1000 living births, compared with 6·4 in the same month in the previous year. The infantile mortality was 67·8 per 1000 living births, which also represented an improvement.

### *University News.*

In almost all departments of McGill University the standards for entrance have been raised. In the faculty of dentistry the change is especially notable, and a two years' course in arts as a preliminary to the four years' dental course is now required. No changes of importance have been made in the curriculum of the medical student who has two years' general education in arts followed by five years' medical study.

Dr. A. A. James, of the Western University, London, Ontario, has been given a grant of £200 by the Advisory Council for Scientific and Industrial Research to assist him to continue the work on the effect of liver extract on blood pressure, on which he has been engaged for some time with Dr. Laughton.

A Department of Child Study has been started at McGill University and has been endowed with £2000 a year for five years. A nursery school of 20 pupils has recently been opened.

On Feb. 13th a portrait of Dr. Francis J. Shepherd, Emeritus dean and professor of medicine at McGill, was unveiled in the University. Dr. Shepherd, who is now 76 years of age, gave an interesting account of the changes he had seen in 56 years at the school.

Much regret is felt at the death in Montreal of Dr. Thomas Workman Burgess, who was born in 1849 and served as surgeon to the North America Boundary Commission. Later he became professor of mental diseases at McGill University, and was well known as a trenchant and able writer on psychiatry.

## IRELAND.

(FROM OUR OWN CORRESPONDENT.)

### *Street Accidents in Dublin.*

THE police authorities in Dublin have lately been giving attention to the prevention of street accidents, and have issued an appeal to all users of the streets to help in reducing the number of accidents. Large posters have been printed and distributed to all important owners of street vehicles, to be displayed in garages and other places where they can be seen by drivers. The posters set out in simple language what is to be done to avoid accidents, and those in charge of vehicles are asked to coöperate with the police on the lines suggested. It is pointed out that the street accident rate in Dublin has doubled in two years. In 1925 there were 1163 traffic accidents, in which 29 persons were killed, 88 seriously injured, and 595 received minor injuries. Handbills have been issued advising pedestrians and cyclists how to behave in the streets. In some cases the punishment of persons culpably responsible seems unduly light. Last week a motorist was convicted of the manslaughter of a young boy in a Dublin thoroughfare. Having killed the boy he drove off, nearly killing a policeman who tried to stop him. The judge in sentencing him said that he had killed the boy "by wilful, reckless, negligent driving." Yet the sentence imposed was only six months' imprisonment with hard labour.

### *Sanitary Condition of Monaghan.*

Dr. Robert McDonnell, one of the medical inspectors of the Department of Local Government and Public Health, recently investigated the sanitary condition of the town of Monaghan, and the state of affairs he describes in his report is shocking. "Wretched hovels," he says, "inhabited by human beings, without light, without space, and without the ordinary conveniences of a dwelling-house, go to make up the lanes and side streets of the town. The byres, where the milk consumed in the town is produced, are on a par with the slum houses—dark, damp, and dirty. Healthy, clean milk could not be produced in some of the cowsheds visited by me." There was, he said, no inspection of milk or meat supplies. The surroundings of the slaughter-houses were insanitary. The sewage arrangements were very bad. There were only old stone drains, and many streets had no sewers at all. The old ones were worse than useless, and were a grave menace to the public health of the town because they could not deal with the volume of sewage requiring removal, and their discharge caused gross pollution of an open river which runs close to the town. About 200 dwelling-houses were without sanitary conveniences

of any kind. The lanes and alleys were in an appalling condition.

The conditions disclosed by Dr. McDonnell are almost incredible unless it is remembered that there is as yet no public health administration in the ordinary sense in Ireland. Only two cities—Dublin and Belfast—have whole-time medical officers of health, and it was only last year that the legislature of the Free State made it compulsory for county health authorities to appoint whole-time medical officers of health. It has not been possible yet to put this provision into force, but preparations are being made to do so.

# The Services.

## ROYAL NAVAL MEDICAL SERVICE.

Surg. Comdr. A. K. Smith-Shand is placed on the Retd. List with the rank of Surg. Capt.

### ROYAL NAVAL VOLUNTEER RESERVE.

Proby. Surg. Sub.-Lt. R. R. Dodd to be Surg. Sub.-Lt.

## ROYAL ARMY MEDICAL CORPS.

### TERRITORIAL ARMY.

Capt. G. F. Wilson is granted pay and allowances of his rank.

Lt. I. Morgan ceases to hold a commission in the Territorial Army.

G. Fitzmaurice Keatinge (late R.N.V.R.) to be Lt.

### MILITIA.

Capt. G. A. Cole to be Maj.

## ROYAL AIR FORCE.

Flying Officer R. H. Stanbridge is promoted to the rank of Flight Lt.

Flight Lt. H. E. Flavelle (Capt., Army Dental Corps) relinquishes his temporary commission on return to Army duty.

## INDIAN MEDICAL SERVICE.

Maj. Narendra Singh Sodhi to be Lt.-Col.

The King has approved the restoration to the active list, from the temp. non-effective list, of Capt. Pirojsha Merwanji Antia.

The King has approved the retirement of Lt.-Col. W. McM. Pearson.

## FOREIGN DECORATIONS FOR SERVICES DURING THE LATE WAR.

The King has given unrestricted permission to the following officers to wear the Médaille de la Reconnaissance Française en Vermeil, conferred upon them by the President of the French Republic: Brevet Lt.-Col. W. H. G. H. Best, R.A.M.C. (Special Reserve).—en Argent: Maj. H. D'Arnim Blumberg, O.B.E., T.D., R.A.M.C. (T.); Capt. A. J. Clark, M.C., R.A.M.C. (Special Reserve); Lt.-Col. H. Collinson, C.B., C.M.G., D.S.O., T.D., R.A.M.C. (T.); Maj. J. M. M. Crawford, O.B.E., R.A.M.C.; Capt. J. Jackson, R.A.M.C. (T.); Capt. L. de G. Joubert, C.A.M.C.; Capt. J. A. Lorrain, C.A.M.C.; Maj. J. A. Lussier, C.A.M.C.; Maj. M. J. Mahony, D.S.O., T.D., R.A.M.C. (T.); Maj. A. J. Mollison, Aust.A.M.C.; Maj. G. S. Parkinson, D.S.O., R.A.M.C.; Temp. Capt. W. H. Rayner, R.A.M.C.; Lt.-Col. P. Z. Rheaume, C.A.M.C.; Maj. A. N. Rivet, C.A.M.C.; Lt.-Col. E. Ryan, C.M.G., D.S.O., R.A.M.C.; Maj. Edouard Charles Saint-Pierre, C.A.M.C.; Col. A. D. Sharp, C.B., C.M.G., T.D. (T.); Maj. G. H. Stevenson, O.B.E., M.C., R.A.M.C. (Special Reserve); Capt. E. S. Stork, D.S.O., R.A.M.C. (T.); Capt. E. W. Strange, R.A.M.C. (T.); Col. C. P. Templeton, C.B.E., D.S.O., C.A.M.C.; Col. A. G. Thompson, C.M.G., D.S.O., retd. pay; Maj. A. C. Turner, D.S.O., T.D., R.A.M.C. (T.); Temp. Capt. D. Ll. Williams, M.C., R.A.M.C.; Maj. H. K. Griffith, T.D., R.A.M.C. (T.); Temp. Capt. J. Jardine, O.B.E., R.A.M.C.; Maj. W. F. McAllister-Hewlings, R.A.M.C. (T.); Capt. Ernest Brooke Pike, R.A.M.C. (T.); Capt. W. G. Shakespeare, R.A.M.C.; Maj. H. C. Sidgwick, O.B.E., R.A.M.C.; Capt. E. M. Townsend, M.C., R.A.M.C.; Maj. G. W. W. Ware, D.S.O., R.A.M.C.

Dr. Thomas Lawson Craig (senior medical officer) has been appointed a Member of the Executive Council of the Gambia and an Official Member of the Legislative Council of that colony.

# Correspondence.

"Audi alteram partem."

## TREATMENT IN DISEASE OF THE NERVOUS SYSTEM.

*To the Editor of* THE LANCET.

SIR,—The excellent Lettsomian lecture in your issue of Feb. 20th by Dr. Farquhar Buzzard is so transparently honest that it may seem rather ungracious to offer any criticism; however, as it appears to me to require some elucidation I reluctantly undertake the task.

Dr. Buzzard is evidently anxious to tell the truth, the whole truth, and nothing but the truth, but, not infrequently, he so glosses over the truth that it would be impossible for any patient to fully realise the hopeless character of the opinion which he has heard expressed. Although I have dabbled a little in nervous diseases, the utter futility of treatment, as carried out in the present day, has prevented me from ever specialising in the subject, and I only now present my opinion for what it may be worth. I have often said that any real advance in the treatment of disease must be on the lines of prevention. Here there is practically an untilled field, but the great drawback to its cultivation is that prevention does not pay. In 1907 and often since I have suggested that payment should be by results, and in the case of death the medical attendants might be required to pay the funeral expenses. If this were in vogue in the treatment of nervous diseases neurologists might often end their days in an asylum for the destitute. Occasionally patients, and often their friends, "want to know the worst," so that the consultant is frequently tested as to how to tell the truth, the whole truth, and nothing but the truth without any unnecessary circumlocution and without any exposure of his own ignorance.

The helplessness of the neurologist in dealing with lesions of the upper motor neurone points to the advantage of prevention over any attempted cure, and this is by no means a hopeless task if more attention were paid to the vascular system. There is no insuperable difficulty in preserving the blood-vessels of the brain, as well as elsewhere, in a healthy condition, even to advanced age.

Dr. Buzzard expresses his opinion of the uselessness of electricity in these upper neurone cases in no uncertain language, and I do not cavil with him on the point, though I think his opinion might be more accurately expressed. "If all the current wasted in a year on the limbs of hemiplegic patients could be stored in accumulators, the Prime Minister's scheme for supplying electricity to the country would be rendered superfluous." He surely should have based his conclusion on reliable evidence as to the amount of current thus running to waste. It might then have been possible to calculate how many miles it would drive a tramcar or an electric train. Our electrical engineer informs me that the electricity supplied by the Liverpool Corporation in the year 1925 amounted to 167,409,433 units, and you might add another sixth for private manufacture in large works. I have no hesitation in hazarding the assumption that all the electricity used for medical purposes throughout England in ten years would not supply Liverpool for one hour, unless, perhaps, in the middle of the night, when deadly silence prevails, and only the street lamps are dimly shining. The Prime Minister had, therefore, better go on with his scheme until he gets more reliable evidence as to its superfluity.

In dealing with the lower motor neurone electricity seems almost permissible. In progressive muscular atrophy, bulbar paralysis, and amyotrophic lateral sclerosis you may say to the patient: "Some of your muscles are wasting and becoming weak; you must have some massage and electrical treatment to strengthen them, and I will give you some injections of strychnine in order to tone up your nervous

system." Here, again, I think the condition of the vascular system is worthy of some consideration.

In an address which I gave in London in 1924 the following paragraphs occur :—

"*Progressive Muscular Atrophy.*—The acute form of anterior poliomyelitis occurs chiefly in children, and is an infectious disease which usually affects the lower extremities; this special selection is probably due to a greater vascular supply to the lumbar enlargement of the cord.

"The grey matter of the cord is supplied by the anterior spinal artery, and in early age the artery is very pliant and ready to supply the blood according to the demands of the part. In these cases the best treatment is absolute rest; elevate the hips and apply a spinal ice-bag over the lumbar and lower dorsal region of the cord. A febrifuge with salicylate of sodium is useful.

"In later years progressive muscular atrophy is a degenerative lesion and affects chiefly the upper extremities, and is due to an insufficient supply of blood to the cervical enlargement. So far as my experience goes it occurs mostly in teetotallers and milk drinkers. The excessive supply of calcium leads to contraction and sluggish circulation in this small artery and its branches, with degeneration and calcification.

"When the disease occurs it is too late to influence the rigid vessel through the depressor nerve. The treatment, therefore, should be preventive both in its origin and progressive character.

"I prefer claret and lemon squash to milk and hard water. Exercise rather than a life of ennui."

Dr. Buzzard concludes his sombre lecture as follows :—

"In this my first of three lectures I have chosen for discussion some disorders of nervous function the causes of which we are powerless to influence or control."

I am now more than ever convinced that, owing to the hopeless and helpless muddle of therapeutics, the only salvation for the race consists in healthy breeding. *Mens sana in corpore sano*, and preventive medicine.

I am, Sir, yours faithfully,

Liverpool, Feb. 25th, 1926. JAMES BARR.

## FAMINES IN THE TROPICS.

*To the Editor of* THE LANCET.

SIR,—Famine at the present time in the Gabun, French Equatorial Africa, with, according to Dr. Albert Schweitzer, its attendant dysentery and "human beings who are mere skeletons and with terrible sores on their feet," invites attention to an onerous phase of work which falls at intervals to the medical man in the tropics. Records of past famines and the means employed for relief of distressed populations accordingly are of value to them, in arriving at decisions as to principles to be advised. In this spirit will doubtless be consulted the recently published "History of India" by Prof. Dodwell, in which modern famine relief measures as applied in India receive attention. But, "history as she is wrote" and facts of the past notoriously are liable to differ, and, in this case, I think it desirable, in common justice to the members of the Services employed under the Government of Madras and their many philanthropic helpers in the great famine of 1876–78, to point out that the scathing assertions made by the author at p. 79 of his work are not justified by the official documents [1] upon which he states he has relied for information.

After suggesting that "great variation in laxity and strictness" in administration existed, he assigns to Bombay the credit of prompt action in opening "great relief works" and using special scrutiny as to gratuitous relief. "*But*," he states, "in Mysore and Madras attempts were made to encounter an almost overwhelming disaster on the principles that had been applied to the scarcity in Behar, until the Viceroy Lytton had visited the scene in person and secured the adoption of methods employed in Bombay, which he perceived *were less wasteful not only of the resources of the State, but also of human life*" (italics not in the original). This would imply that the Government of Madras were untrammelled by the Government of India from October, 1876, to August 29th, 1877, when the Viceroy made the personal visit specified; whereas, at the very origin of the famine, the Government of India not only claimed but insisted upon its absolute right of dictating the policy of the subordinate Governments of Madras and Bombay. As to Mysore, if matters there were inefficient, the Government of India was directly responsible, while so far as Madras is concerned, the author's statement of incidents is incorrect.

At the critical period as to the failure or not of the monsoon, in the presence of stocks of grain "held back" by the well-organised and astute Chetty caste of merchants peculiar to the Madras Presidency, with instantly resulting artificial famine prices, the Government of Madras desired to contract for the importation of 30,000 tons of rice to be held as a reserve. After seven days' delay in replying to telegrams on the subject, the Government of India, which in the Behar famine had countenanced the importation of 480,000 tons of grain, gave a flat refusal. This is the sole justification for the historian's allusion to the Behar "principles." The Government of Bombay were saved from facing the same "profiteer" difficulty by splendid private philanthropy. The Government of Madras had given to the Government of India timely warning of possibly impending famine, and definitely suggested concentration of labour on great works as "most necessary," but sanction was refused; (*a*) local petty works near villages solely were approved. This implied the organisation of petty works to serve a population of 20,000,000 scattered through 80,000 square miles.

These two refusals were followed by the Government of India deputing a delegate to the Madras Presidency, armed with instructions which forcibly suggested economy. In the presence of famine prices and absence of labour possibilities, within six weeks of the delegate undertaking duty, as a result of his special method of elimination, (*b*) a reduction of 509,934 persons employed on relief works, or receiving gratuitous relief, was carried out. Against the protests of the then Sanitary Commissioner for the Government of Madras, Surgeon-Major (subsequently Surgeon-General) Cornish, C.I.E.—not only an expert sanitarian, but one who had for many years investigated specially and reported on Indian dietary—the wage on relief works was (*c*) reduced to the equivalent of one pound of grain with one half anna (say, three farthings) to cover the cost of condiments, essential pulses, fats, and antiscorbutics. Therefore, on a diet yielding 1640 calories [2] represented in rice (practically the only grain then available) per adult man, not only tasked labour but frequently, in addition, many miles of march daily to and from the relief works were demanded. From Jan. 31st, 1876, to May 22nd, 1877, this diet was in force, when, in view of strong public opinion, with the approval of the Secretary of State and the concurrence of the Government of India, it was withdrawn.

In para. 7 of his Minute of August 12th, 1877, the Viceroy conceded that the policy of his Government in forbidding large works at the origin of the famine was erroneous. In the meantime, the effort to close petty works opened as originally ordered accentuated the aimless wanderings and begging which resulted from policy (*b*), whilst the effect of policy (*c*) was to crowd the hospitals and relief camps with masses of men, women, and children rendered absolutely unfit for the work by reason of malnutrition. A "trial census" within the famine area of the Madras Presidency showed that the united results of factors (*a*), (*b*), and (*c*) had been to bring about a decrease of 3,000,000 in the population under the heads of emigration, decline of birth-rates, and increase of deaths. It is possible to show that following consultation with the Government of Madras, strengthening of staffs and improvements in details of organisation were adumbrated after the visit of the Viceroy, but the fact remains that no

[1] These are sufficiently found in the Famine Campaigns of South India, by Digby (two volumes), Longmans, 1878.

[2] Calculation for unpolished rice according to Plimmer.

human efforts could get rid of the effects of the false policy on which the campaign had been opened. Cornish, the sanitarian, had correctly protested that "in consideration of the fact that diseased conditions dependent on insufficient food follow many months after the cause has passed away, I apprehend that a heavy and unusual mortality will continue." The "practical" lay administrators who evolved the theory of merely sustaining life as distinct from fitness for labour, which should have been the goal, were confronted with the curious psychology and the *literally* irremediable state in subjects of prolonged chronic starvation, as contrasted with results in the acute form, which alone could have afforded any basis for their disastrous theories.

If both the Presidencies of Madras and Bombay were subject to the overrule of the Government of India, and if, as was the case, in both, the European and Indian officials concerned worked in the interests of the saving of life to the limit of human endurance, and yet a difference in results is demonstrable, this was solely due to the latter Presidency in the early period of famine adopting Nelson's method when obeying the orders of the Government of India.

I am, Sir, yours faithfully,

W. G. KING,
Colonel, I.M.S. (ret.)

Hendon, N.W.

## STRICTURES OF THE URETHRA.

*To the Editor of* THE LANCET.

SIR,—I have read with great interest the article on Strictures in THE LANCET of March 6th by Mr. Girling Ball. In the main his description is admirable, but it does not advance the question of treatment far beyond that which was in vogue 15 or even 20 years ago. He only carries dilatations to 14/16 English —i.e., 24/27 Fr. Now it can be easily proved, by anyone who likes to take the trouble to make the observation, either on the cadaver or on the living subject under *efficient* local anæsthesia, that with the exception of the fossa navicularis and the external meatus the adult human urethra can be dilated easily to 45 Fr. (28 English). This observation was made in Germany years ago towards the end of the last century. It is so definite that I regard it as axiomatic that, if a urethra does not dilate to this calibre easily, it is the seat of an abnormality requiring closer investigation. In nine cases out of ten this abnormality will be found to be a stricture of large calibre which is quite capable of being treated and cured.

It is often impossible to detect such an early stricture with sounds because an instrument large enough could not pass the external meatus. The Kollmann, or similar expanding dilator, must be used. Again, if we are dilating a smaller stricture, why stop at 27 Fr. when it is possible to go on to 45, so much nearer the healthy natural size? Nature does not provide so large a canal for nothing, but it is impossible here to go into what I believe to be the reasons for this; suffice it to say that they are important and have a bearing on the health of the patient in later life.

Again, Mr. Girling Ball states that pain during the passage of instruments "can *sometimes* be avoided by the instillation of 2–4 per cent. novocaine." Now if efficient dilatation is to be carried out to the limits I have mentioned pain must be avoided *always*. Novocaine, whilst it is an admirable local anæsthetic when injected beneath the epithelium, is not good when applied to a mucous surface, as it lacks penetrating power. A 2–4 per cent. solution of cocaine is the only local anæsthetic possessing this power to a satisfactory degree, but its dangers negative its use except under special conditions. Fortunately, if the cocaine is combined with sodium bicarbonate, it is possible to obtain a solution which is of such low concentration that, in an experience of its use extending over many thousands of cases, I have never seen a single unpleasant symptom. The solution is a 0·5 per cent. solution of cocaine hydrochloride with a similar concentration of sodium bicarbonate, and it is a matter of standard routine to use it on every case in which I propose to pass instruments through the urethra. It gives all the anæsthesia that is required. Recently borocaine has been tried and the results are so far encouraging.

I am, Sir, yours faithfully,

H. L. ATTWATER, M.Ch., F.R.C.S.,
Assistant Surgeon to All Saints' Hospital

Wimpole-street, W., March 7th, 1926.

## HAGIOLOGICAL THERAPEUTICS.

*To the Editor of* THE LANCET.

SIR,—Your readers may be interested to hear of a method for testing a new remedy which was employed in the ninth century, and is recorded in the "Chronicon Turonense Magnum," a monkish chronicle probably of the twelfth century.

In 852 the Danes, under Rollo, threatened Tours, but as the floods prevented their attacking it they turned to Marmoutier (Majus Monasterium), about a mile up the Loire on the north bank, killed 116 monks, tortured the abbot to make him reveal the treasures, but in vain, and retired. As they threatened to return, the canons of Beatus Martin of Tours conveyed the body of the saint to Auxerre for safety. The result was a large increase in the miracles there, a large influx of pilgrims, and a large addition to the revenues of the Church of S. Germain, in which Martin's body was laid. The miracles were claimed by the canons of B. Martin to be his work, but the Auxerre clergy manfully (viriliter) asserted that they were the work of S. Germain. They agreed to test the question by laying a leper between the two saints and observing which side of him was cured. "Quid plura?" It was done, and the side next Martin was alone cured. But they very rightly thought that this experiment should be controlled. The leper was therefore reversed, and his diseased half, now next to Martin, was at once cured. "And so the strife between the clergy was set at rest and the offerings were from that time paid to the servants of B. Martin."

It is not surprising to learn that 31 years later, when times were quieter and the Tourangeois asked for Martin back again, the Bishop of Auxerre refused, and the saint was only recovered by an armed force led by Ingelger Count of Angers, the ancestor of the Angevin line. The progress of the body was marked by the healing of all the sick along the route, including those who were not brought in contact with it, those who did not implore the saint's help, and even those who did not want to be cured (inviti), which was recognised as a proof of the saint's unusual clemency. It may be added that though it was December the trees broke into leaf and flower.

I am, Sir, yours faithfully,

W. P. HERRINGHAM.

London, March 8th, 1926.

## THE RISKS OF THE SAILOR.

*To the Editor of* THE LANCET.

SIR,—Many will be glad to note the prominence which is given regularly in THE LANCET to the exposure of seamen to gross defaults of social hygiene. When a ship comes into port its crew is regarded as the legitimate prey of prostitutes, the vendors of poisonous and doctored liquor, and the keepers of unlicensed lodging-houses. It is in evidence that in numerous cases prostitutes under treatment for venereal disease in its infectious stages in hospitals and infirmaries take their discharge from these institutions on the arrival of an expected ship in port, in order that they may be in readiness to meet the sailors as soon as they are paid off. In these circumstances it cannot be wondered that the number of cases of gonorrhœa and syphilis among seafaring men is rather high, and that sailors, having contracted the disease at one port, frequently spread the infection at the next calling station of their ship. If it were possible to provide healthy recreation in the open air with organised games such as football, hockey, &c., for these young men, experience teaches us that the

infection rate would materially diminish. When the Contagious Diseases Acts were repealed in 1885 the number of cases of venereal disease in the Aldershot Command was about 327 per 1000. In 1914 it had diminished to a little more than 33 per 1000. This was mainly due to the efforts made by the officers, both combatant and medical, to provide out-door games, sports, and other recreations to give the soldiers some healthy occupation when off duty. Conferences are now being held in the seaport towns, and committees appointed, to promote the same state of affairs for seamen when on shore. Great and most valuable work is being done by the various organisations and associations which look after the welfare of sailors, but the coöperation of local authorities, athletic, and sporting clubs who have suitable grounds is required to make a success of the movement. If it were possible to meet and get hold of the boys and younger members of the crew on the arrival of a ship and offer them healthy and health-giving amusement, the number of risks of infection taken would be enormously reduced, with a corresponding decrease in the number of cases of disease. From a health point of view it is to be hoped that the members of our profession practising in seaport towns will, whenever possible, give their hearty support to this attempt to improve the health of our seafaring population. Measures are being taken in foreign seaports to provide the same facilities.

I am, Sir, yours faithfully,

London, March 8th, 1926. E. B. TURNER.

## THE INCIDENCE OF PHLEBITIS.

*To the Editor of* THE LANCET.

SIR,—I should be interested to know whether there has been a general increase in the number of cases of phlebitis of the veins of the lower limb during the past 12 months. In this district the number has been comparatively large and the history of each case similar—i.e., sudden onset with fever, a tendency to spread to the veins of the opposite limb, and a large proportion of pulmonary infarcts. In one case there occurred multiple cerebral emboli leading to extensive softening and progressive dementia. Since ordinary treatment appears to be quite ineffective in staying the course of the disease, a hint as to a specific bacterial origin would be valuable.

I am, Sir, yours faithfully,

JOHN WHITTINGDALE.

Sherborne, Dorset, March 8th, 1926.

## "IS CIVILISATION A FAILURE?"

*To the Editor of* THE LANCET.

SIR,—Your note on Sir Arbuthnot Lane's discourse upon the old question "Is Civilisation a Failure?" (asked long ago more poetically by Bret Harte) is most interesting, especially in the light shed upon it by Prof. John Dewey and Mr. Matthias Alexander. According to Sir Arbuthnot Lane, the failure of civilisation lies in an alteration of the simple mechanical relationship Nature intended us to maintain towards our surroundings, and this has caused alterations in human anatomy which have produced all the ills from which we suffer to-day. That the numerous and heavy calls which civilisation has made upon the human organism have resulted in failure to respond with sufficient rapidity to altered environment is an undoubted fact, and no doubt the lecturer obtained this information from Alexander's "Constructive Conscious Control," with which I know him to be acquainted. One fails to see, however, what "alterations in human anatomy" this failure either could cause or has caused in the short period during which man has been civilised. That it has resulted in serious *wrong functioning*, both in body and mind, is what Alexander has insisted upon in the work mentioned, and it is nowhere better seen than in the attitude of most of our lecturers on health to-day. What Alexander has done is to find a specific remedy for this wrong functioning in his technique of re-education.

I am, Sir, yours faithfully,

MACLEOD YEARSLEY.

Wimpole-street, W., March 4th, 1926.

## A HUGE EMPYEMA.

*To the Editor of* THE LANCET.

SIR,—I was particularly interested in the letter of Mr. J. Cæsar, in the last issue of THE LANCET, giving the notes of two cases of empyema. The evacuation of eight pints of pus by the aspirator at one sitting is not quite a record, as I have myself drawn off over nine pints in a similar case. The notes of this case are, I think, of interest, in that the patient's symptoms were not sufficiently severe for him to consider himself ill enough to "report sick," until he was in a really serious condition.

While acting as ship's surgeon I was summoned to the forecastle to see a fireman aged 41. Temp. 103·5° F.; pulse, 140. There was an area of dullness extending from the right lower costal margin to the fifth intercostal space. I diagnosed pleural effusion, and the next morning I introduced a needle, under novocaine anæsthetic, in the eighth intercostal space, and was amazed when I drew off nine and a half pints of foul-smelling pus. Within an hour his temperature had fallen to 101° and his pulse-rate had become 110 per min. Two days later, on reaching port, I sent him to hospital. Six months afterwards I met him, and he told me that he had made an uninterrupted recovery in hospital, where he remained only 15 days, and, since his discharge from the hospital, had made a trip to the River Plate and back.

I am, Sir, yours faithfully,

D. GORDON ROBINSON,
Late Surgeon, Ellerman's Wilson Line.

Hull, March 5th, 1926.

## A DIAGNOSTIC SKIN REACTION FOR TYPHOID.

*To the Editor of* THE LANCET.

SIR,—The value of the Dick test as a diagnostic agent in scarlet fever consists in its ability to exclude the possibility of scarlet fever in those who fail to react. If the reaction to a Dick test be positive the patient may still not have scarlet fever. The test is therefore of limited value in the case of scarlet fever. But we may suppose that in England, at least, the great majority of the population are susceptible to typhoid fever, and it is therefore probable that were a skin sensitivity test, on the principle described in your annotation of Feb. 6th, ever perfected it would be of very little diagnostic value.

I am, Sir, yours faithfully,

Ohio, Feb. 19th, 1926. J. ROSSLYN EARP.

SUSSEX EYE HOSPITAL.—The year 1925 marked the ninety-third anniversary of the Sussex Eye Hospital in Queen's-road, Brighton. The governors are continually faced with financial difficulties, and with the strictest economy in every department the year 1925 ended with a deficit of £301. Legacies fortunately liquidated this sum and left a little over. It was pointed out, however, at the annual meeting of the governors on Feb. 10th, that at least another £300 a year was required if current expenses were to be paid out of current income. There is an overdraft of £471 due to the bank, and at least £1000 is needed to place the institution in a proper state of repair. The work continues to grow. In 1919 there were 244 in-patients during the year and 2572 out-patients; in 1925 the figures were 350 and 4995 respectively. A statute having been altered so as to permit the election of more than one patron, the Duke of Richmond and Gordon and the Earl of Chichester have been elected.

# Obituary.

## WILLIAM CHARLES SULLIVAN, M.D.R.U.I.,

MEDICAL SUPERINTENDENT OF BROADMOOR.

THE death, which occurred on March 1st, of Dr. William Sullivan, the medical superintendent of Broadmoor Criminal Lunatic Asylum, removes from the Government service a highly valued officer, while we shall no longer have the opportunity of putting before our readers his strong but well-balanced views on many of the medical questions which came within his special cognisance.

William Sullivan, the youngest son of Dr. W. K. Sullivan, a President of Queen's College, Cork, was born in 1869 and educated in Cork and Dublin. He graduated in medicine at the Royal University of Ireland in 1891, being later Stewart scholar in mental diseases, and then spent a considerable time in Paris, where be obtained his accurate acquaintance with French work in psychiatry. He decided to enter the prison service and his first appointment was in H.M. Prisons Liverpool, but he afterwards held office at Parkhurst, Holloway, and Pentonville. He was then appointed medical superintendent of the State criminal lunatic asylum at Rampton, a post which he held until he succeeded to the superintendency of Broadmoor in 1920, upon the retirement of Sir Richard Brayn.

He came prominently before the public as a member of the Advisory Committee appointed in 1916 by the Central Control Board (Liquor Traffic) to consider the conditions affecting the physiological action of alcohol. The particular reference of this Committee was to report upon the effects of health and industrial efficiency induced by the consumption of beverages of various alcoholic strength. The Committee was strongly composed with Lord D'Abernon as chairman, the others members being the late Prof. Cushny, Dr. H. H. Dale, Dr. M. Greenwood, Dr. W. McDougall, Sir George Newman, Sir Frederick Mott, Sir Charles Sherrington, and Sullivan, and to Sullivan personally much of the credit of the work done is due, for it was largely through him that the necessity for fundamental change in the hours during which public-houses may remain open became recognised as a necessity. The long afternoon break in public-house hours has led to a decrease alike in drunkenness and alcoholic morbidity, and none of the critics of the reform—there were and are many—have ever been able to gainsay the advantages obtained. Sullivan's presence on the Committee was due partly to a general appreciation of his administrative work among two classes where alcohol produces disastrous ravages, but particularly to the accurate information and sound views which he had placed before the public some ten years previously in a treatise on the whole subject of alcoholism, regarded as a chapter in social pathology.

Sullivan was a man of high literary ability, and his lectures on criminology and forensic medicine, delivered at the Maudsley Hospital, his editorial writing in THE LANCET and his contributions to the *XIX. Century and After*, and various home and foreign organs, all displayed an easy erudition and a power of speaking clearly as well as emphatically. These qualities were marked in his valuable treatise "Crime and Insanity" written after he had been superintendent at Broadmoor for four years. The subject bristles with difficulty; medicine is everywhere involved in a controversial manner, while legal positions are often hard to appreciate. But Sullivan's treatment is fair as well as clear; his commonsense views were based on his scientific grasp of the problems, and his urbanity was due to a recognition of difficulties and not to any facile compromises.

Dr. Sullivan had been for a short time in delicate health, but the end came unexpectedly. He leaves a widow, herself an accomplished author, by whom he had one son.

## SUTHERLAND SIMPSON, M.D., D.Sc. EDIN.

THE death of Prof. Sutherland Simpson on March 3rd at his home at Ithaca, New York, ends a very remarkable career. Born in Orkney in 1863, Simpson left home whilst still fairly young and found his way south to Leith, where he answered an advertisement of Prof. William Rutherford's for a laboratory assistant in the department of physiology in the University of Edinburgh. His application was successful, and Prof. Rutherford soon discovered that his new assistant had ambitions and merits far beyond his position. Accordingly, Simpson was encouraged to attend classes at the Heriot Watt College in Edinburgh and very rapidly passed the preliminary examinations which qualified him to start on a scientific career. Next Rutherford made it easy for him to go to the University lectures, and in 1894 the laboratory assistant became a Bachelor of Science at the age of 31. With this success, however, he was by no means content. He asked permission to attend the medical courses, qualified in 1899, and in 1901 graduated as M.D., being awarded the gold medal for his thesis. In 1903 he became a Doctor of Science as well. And all this was achieved whilst Simpson was daily occupied in the laboratory and assisting the professor in his lectures. In the laboratory, of course, his status soon improved. He gained the Crichton Research Scholarship in Physiology, was elected Goodsir Memorial Fellow in Anatomy and Physiology, and, later, became lecturer in experimental physiology and assistant to the professor. During these Edinburgh days he found time for original work on secondary degeneration following injury to the cerebral motor cortex, on the pyramidal tracts, and on the regeneration of temperature. In the first decade of the twentieth century opportunities for young physiologists and pharmacologists presented themselves in colleges in the United States, and in 1908 Simpson was elected professor of physiology in the University of Cornell, a post he held until his death. There he gave himself up to teaching and research, and he and his pupils, amongst other contributions, published memoirs on the effects of excising the thyroid gland. Prof. Simpson married in 1908 Catherine G. P. Anderson, of Edinburgh.

## JOHN ALFRED SCOTT, M.D. DUB., F.R.C.S.I.

Dr. J. A. Scott, professor of physiology in the School of the Royal College of Surgeons in Ireland, who died on March 6th in his seventy-first year, was at work until the evening of his death. For the last year or two it had been clear that Dr. Scott was in failing health, but he sought no medical advice and worked hard.

John Alfred Scott was born in Dublin, and received his medical education at the Ledwich and Carmichael medical schools in that city. He qualified in 1881 and subsequently graduated in medicine at Dublin University; in 1886 he became a Fellow of the Royal College of Surgeons in Ireland. Soon after qualification he devoted himself to the study of physiology, and was appointed professor in the Carmichael School. In 1889, when the school was amalgamated with the school of the College of Surgeons, he became professor of physiology in the College, and he continued in this post to the day of his death. He was also for a long time pathologist to the Adelaide Hospital, and for some ten years acted as general secretary of the Royal Academy of Medicine in Ireland, contributing frequently to its communications. Prof. Scott was greatly interested in photography, and was an excellent photographer himself. Amongst his other interests was zoology, and for many years he was a member of the Council of the Royal Zoological Society of Ireland, being indefatigable in his work on behalf of the society and its gardens. As a teacher he was painstaking, clear, and forcible. He had the great gift of interesting his class, and he seemed able to enter into the difficulties of a student. His students came to love him as a friend who gave them unsparingly of his best.

# Parliamentary Intelligence.

## HOUSE OF COMMONS.

WEDNESDAY, MARCH 3RD.

*Mortality from Small-pox and Encephalitis Lethargica.*

Mr. COMPTON asked the Minister of Health to state what had been the percentage of mortality in the years 1924 and 1925 in small-pox and encephalitis lethargica, respectively.—Mr. NEVILLE CHAMBERLAIN replied: The case mortality rates—i.e., deaths per 100 notified cases, were: Small-pox, 0·35 per cent. in 1924 and 0·17 per cent. in 1925; encephalitis lethargica, 27·9 per cent. in 1924 and 50·6 per cent. in 1925. (The figures for 1925 relate to the first three-quarters of the year.)

*Service Tuberculosis Cases and Insurance Benefit.*

Dr. VERNON DAVIES asked the Minister of Health if men invalided from the Army, Navy, or Air Force, suffering from pulmonary tuberculosis, were granted benefits under the National Health Insurance Act; and, if so, what were these benefits.—Mr. NEVILLE CHAMBERLAIN replied: All men serving in the forces of the Crown are insured under the National Health Insurance Act, and on discharge become entitled, subject to the ordinary conditions, to all the normal benefits of the Act—viz., medical, sickness, disablement, and maternity benefits. Further, any discharged man who has been for the necessary qualifying period a member of an approved society which provides additional benefits, becomes entitled to participate in such additional benefits. These additional benefits may take the form of an increase of the standard rates of sickness, disablement, and maternity benefits, or payment towards the cost of treatment of various kinds—e.g., dental, ophthalmic, hospital, or convalescent home treatment.

*Small-pox and Vaccination.*

Mr. NUTTALL asked the Minister of Health the number of cases of small-pox reported in England and Wales since Jan. 1st last, and the number of non-vaccinated persons who had contracted this disease.—Mr. NEVILLE CHAMBERLAIN replied: During the seven weeks ended Feb. 20th, 1926, 2200 cases of small-pox were notified in England and Wales. Of these cases 1699 are stated to have been unvaccinated prior to infection by small-pox, while in 12 instances information as to the vaccinal condition is not yet available. These figures are subject to revision.

*League of Nations Health Conference.*

Mr. TREVELYAN THOMSON asked the Minister of Health whether the English doctors who attended the conference of the commission of members of the Health Committee of the League of Nations at The Hague from Jan. 4th to the 7th to examine questions in connexion with small-pox, alastrim, and vaccinia, were present as representatives of the English Ministry of Health; and, if not, in what capacity were they there.—Mr. NEVILLE CHAMBERLAIN replied: This conference was convened by the Health Committee of the League of Nations. Sir George Buchanan attended in his capacity of British representative on that Committee. Dr. Gordon and Dr. Blaxall were invited by the Committee as experts possessing special knowledge and experience of the subjects to be discussed.

*Geneva Opium Convention.*

Mr. CAMPBELL asked the Secretary of State for Foreign Affairs which of the powers had ratified the Opium Convention, which was signed at Geneva in February, 1925.—Sir AUSTEN CHAMBERLAIN replied: So far as H.M. Government are aware, no foreign power has yet ratified either the Opium Agreement or the Dangerous Drugs Convention, signed at Geneva on Feb. 11th and Feb. 19th, 1925, respectively. The British ratifications of the Agreement and Convention were deposited with the League of Nations on the 17th ultimo.

THURSDAY, MARCH 4TH.

*Cost of Tuberculosis Sanatoria.*

Dr. WATTS asked the Minister of Health the total amount expended on the provision of sanatoria for the treatment of tuberculosis in England and Wales; the annual cost of upkeep; the number of cases treated; and the percentage of cures claimed.—Mr. NEVILLE CHAMBERLAIN replied: The total capital expenditure incurred by local authorities in England and by the King Edward VII. Welsh National Memorial Association on the provision of residential institutions for the treatment of tuberculosis is approximately £4,400,000; the annual cost of the residential treatment of patients under the tuberculosis schemes of local authorities in England and Wales is approximately £2,312,000; and the average number of cases under treatment at any one time is approximately 18,850. As regards the last part of the question, I regret that no figures are at present available for the country as a whole, but I may refer my hon. friend to the report issued by the Medical Research Council (Special Report Series, No. 85) as to patients treated in the Frimley sanatorium.

*National Health Insurance Report.*

Mr. RHYS DAVIES asked the Minister of Health whether it would be necessary to introduce legislation to give effect to any or the whole of the recommendations of the Royal Commission on National Health Insurance; and, if so, when it was intended to introduce such legislation.—Mr. NEVILLE CHAMBERLAIN replied: It would be necessary to introduce legislation to give effect to many, but not all, of the recommendations of the Royal Commission on National Health Insurance. I am not in a position to make any statement as to the introduction of such legislation.

*Voluntary Hospitals Commission.*

Mr. CAMPBELL asked the Minister of Health whether, in view of the decision of the Government not to adopt the recommendation of the Voluntary Hospitals Commission to provide, out of public funds, additional beds in voluntary hospitals, it was proposed to continue that Commission; and, if so, what duties remained for it to discharge.—Mr. NEVILLE CHAMBERLAIN replied: Yes, Sir. I have asked the Commission to continue their work both to act as a link between the Government and the voluntary hospitals, and also to keep in touch with the local voluntary hospital committees throughout the country and facilitate communication between them. The Commission will advise me on questions relating to voluntary hospitals, and will collect and circulate information likely to be of assistance to local committees, such as the circular on hospital construction now in course of preparation

*Sterilisation of Milk.*

Lieut.-Colonel FREMANTLE asked the Minister of Health whether tubercle bacilli in milk were killed by sterilisation or pasteurisation as generally carried out; and whether he was aware of any means of killing tubercle bacilli in milk other than by sterilisation or pasteurisation.—Mr. NEVILLE CHAMBERLAIN replied: I am advised that pasteurisation carried out in accordance with the procedure laid down in the Milk (Special Designations) Order confers a very substantial protection against infection by tubercle bacilli. It is probable that the process commercially described as sterilisation affords similar protection, and that this is true in a smaller degree of other methods of treating milk by heat. I am not aware of any other practicable means of killing tubercle bacilli in milk.

Colonel FREMANTLE asked the Minister of Health the proportion of milk estimated to be tuberculous from analysis of samples in London, Birmingham, Manchester, Edinburgh, Leeds, Liverpool, Plymouth, Cardiff, Hull, and Newcastle, respectively.—Mr. NEVILLE CHAMBERLAIN replied: So far as the question relates to Edinburgh it should be addressed to my right hon. friend the Secretary for Scotland. The following is a statement of the number of samples of milk taken in certain towns in England and Wales during 1924 for examination for tubercle bacilli and number found to be tuberculous:—

| Place. | Samples taken. | Samples tuberculous. | Percentage tuberculous. |
|---|---|---|---|
| London (City) . . | 39 | 5 | 12·8 |
| London (County) . . | 2400 | 121 | 5·0 |
| Birmingham . . . . | 303 | 26 | 8·6 |
| Manchester . . . . | 590 | 48 | 8·1 |
| Leeds . . . . . | 68 | 1 | 1·5 |
| Liverpool . . . . | 781 | 79 | 10·1 |
| Plymouth . . . . | 11 | 2 | 18·2 |
| Cardiff . . . . . | 53 | 1 | 1·9 |
| Kingston-upon-Hull . . | 18 | nil. | nil. |
| Newcastle-upon-Tyne | 220 | 7 | 3·2 |
| — | 4483 | 290 | 6·5 |

*Mental Deficients and Assaults on Children.*

Mr. BRIANT asked the Minister of Health if his attention had been called to the case of a lad of 17 who was mentally deficient and was charged at Stratford, E., police-court with an assault on a child of five; if he was aware that the same lad was charged with a similar offence on a previous occasion but, owing to the failure to find a suitable home, was discharged; and if he would see that sufficient homes were provided for these cases so that deficients who were a danger to children should not be allowed to repeat their offences.—Mr. NEVILLE CHAMBERLAIN replied: The answer to the first two parts of the question is in the affirmative. In regard to the latter part of the question, I have already informed the Board of Control that they should press local authorities to fulfil their duty under the Mental Deficiency Act of providing suitable and sufficient accommodation for mental defectives ordered to be sent to institutions. As regards the particular case, the Board of Control have agreed, in the

exceptional circumstances, that if the court orders this youth to be sent to an institution, he can be received into the State institution at Rampton, which has been provided for mental defectives of dangerous or violent propensities.

*Approved Societies and Convalescent Treatment.*

Mr. BRIANT asked the Minister of Health if, in considering the distribution of surpluses of approved health societies, he would take into account the necessity of the provision of sufficient convalescent homes and the granting of full maintenance allowances for the families dependent on the sick persons, so as to ensure that the patients took full advantage of convalescent treatment till full recovery was reached.—Mr. NEVILLE CHAMBERLAIN replied: It rests with each approved society having a disposable surplus on valuation to decide what additional benefits are to be provided for its members out of that surplus. Among such benefits are included the provision and maintenance of premises suitable for convalescent homes, and the payment of the whole or part of the cost of maintenance and treatment of members in convalescent homes, the latter of which is one of the most widely adopted benefits. I am satisfied that societies generally are fully alive to the advantages of convalescent home treatment. There is no provision in the Act for the payment of maintenance allowances for the dependants of sick persons, but while an insured person is being maintained in a convalescent home he would ordinarily be entitled also to sickness or disablement benefit, which would be available towards the cost of the maintenance of his dependants.

*Industrial Accidents in 1925.*

Lord HENRY CAVENDISH-BENTINCK asked the Home Secretary the total number of industrial accidents, fatal and non-fatal, reported during 1925.—Sir WILLIAM JOYNSON-HICKS replied: The total number of persons reported as killed during 1925 by industrial accidents in factories, docks, and other premises under the Factory Acts, in mines and quarries, and in the railway service, was 2471. The number reported as injured by accidents on premises under the Factory Acts was 158,778. The figures as to non-fatal accidents in the other industries mentioned are not yet available, and the figures just given are provisional.

FRIDAY, MARCH 5TH.

*Physical Defects of Naval Recruits.*

Mr. HORE-BELISHA asked the First Lord of the Admiralty what percentage of applicants was rejected for the Navy in the years 1910, 1911, 1912, 1913, and 1925; and what the principal physical defects were, giving the proportions to the total number of rejections.—Mr. DAVIDSON replied: Statistics as regards rejections for physical defects are not available for the years 1910 to 1913. The percentage rejected in 1925 was 87, and of the candidates rejected by the final medical examining officers the principal defects were:

| Defect. | Proportion to total of rejections. |
|---|---|
| Defective vision | 19·39 per cent. |
| Defective teeth | 12·66 ,, |
| Disease of heart | 8·75 ,, |
| Flat-foot | 8·41 ,, |
| Disease of ears | 7·61 ,, |

The preparation of similar statistics for candidates who were not sent to the final medical examining officers would involve an expenditure of clerical work which I do not think would be justified.

*Medical Adviser at the Colonial Office.*

Mr. WALTER BAKER asked the Secretary of State for the Colonies whether he was now in a position to state his decision regarding the proposal to appoint a medical director in the Colonial Office to act as a liaison officer between the Crown Colonies and the Civil Research Committee.—Lieut.-Colonel HEADLAM asked a similar question.—Mr. AMERY replied: I propose at an early date to appoint in the Colonial Office a chief medical adviser whose duty it will be to advise me on all medical and health questions and to see that all important information bearing on these matters is collected and circulated.

*Deaths from Infectious Diseases.*

Mr. WHITELEY asked the Minister of Health how many deaths from influenza, measles, diphtheria, scarlet fever, and enteric fever were registered in the year 1925.—Mr. NEVILLE CHAMBERLAIN replied: Reliable figures are not yet available, but the provisional figures derived from the Registrars' Quarterly Returns, are as follows:

| Disease. | Provisional No. of deaths registered in England and Wales, 1925. |
|---|---|
| Influenza | 12,587 |
| Measles | 5,221 |
| Diphtheria | 2,716 |
| Scarlet fever | 981 |
| Enteric fever | 373 |

Mr. WHITELEY asked the Minister of Health whether he would state the provisional number of cases of diphtheria, scarlet fever, chicken-pox, pneumonia, enteric fever, small-pox, and encephalitis lethargica notified during the year 1925.—Mr. NEVILLE CHAMBERLAIN replied: The figures asked for, with the exception of those for chicken-pox, which is not universally notifiable, are as follows:

| Disease. | Provisional No. of cases in England and Wales, 1925. |
|---|---|
| Diphtheria | 47,723 |
| Scarlet fever | 91,357 |
| Pneumonia | 55,960 |
| Enteric fever | 2,779 |
| Small-pox | 5,363 |
| Encephalitis lethargica | 2,637 |

MONDAY, MARCH 8TH.

*Restrictions on Opium Production in India.*

Mr. CAMPBELL asked the Under Secretary of State for India what new policy had been propounded by the Government of India in regard to the production and export of Indian opium.—Earl WINTERTON replied: In opening the Council of State on Feb. 9th the Viceroy made the important announcement that the Government of India intends, subject to the approval of the legislature, to reduce progressively the export of opium to all destinations so as to extinguish the trade altogether within a definite period except for strictly medical purposes. This policy would involve a corresponding reduction in the amount of opium produced. The period within which extinction will take place has not yet been fixed, and the position of the cultivators is one of the factors that must be taken into account in defining it. The new policy, if approved by the Indian legislature, would go far beyond the international obligations of India, and the Government of India, in proposing it, have been animated by a determination to do all in their power to coöperate to secure that improvement in the world opium situation which was looked for as a result of the Geneva Conference.

*Air Force Medical Services.*

The votes for personnel, pay, stores, buildings, and land in connexion with the Royal Air Force were considered on report.

Mr. BASIL PETO said that he had been looking into the separate medical staff of the Air Ministry. He found that the total of the medical staff was 1377, and the gross cost was £347,500, or, deducting all that was allowed for the part of the medical staff that was paid for under other Ministry votes, it was £209,000 net. The real figure, of course, was £347,500, and the 1377 members of the medical staff worked out at one for every 26 of the whole personnel of the Air Service in Vote A. There were only 920 flying and observer officers this year, or 134 less than last year, and the 1377 medical staff seemed to compare very unfavourably with the total number of flying and observer officers.

Sir SAMUEL HOARE (Secretary of State for Air) said that they were trying, even with the existence of the three Services—the Army, Navy, and the Air Force—to reduce overlapping to the lowest possible limit. [Sir F. WISE: "Hospitals."] They did not want to set up hospitals anywhere where Army and Navy hospitals were providing treatment for Air Force officers and men. To-day, in England, there were only three Air Force hospitals. In each case these were provided where there were no other facilities for the officers and men of the Air Force in the near neighbourhood. There were two hospitals for men and one hospital for officers. In Iraq, where the command was an Air Command, and where the main responsibility was an Air Ministry responsibility, there were no Army hospitals, and the Air Force hospital in Iraq was doing all the work for the British and Indian battalions. He would like to see the arrangement pushed and developed to the full.

In the previous debate a few days ago Lieut.-Commander Kenworthy had twitted the Air Ministry about a dental service. They had no dental service at all. They used the dental officers of the Royal Army Medical Corps. Right through the whole field of common service it was their definite policy, and he could not emphasise that too much, to avoid duplication wherever they could.

Capt. CROOKSHANK said that the House was extremely gratified to hear the promise of the Secretary of State to look into the matter of the doctors and the nurses. Naval nurses did not go to the sea in ships, and air nurses did not go into the air. Why should they not be brought from a common school?

The votes were agreed to.

# Medical News.

UNIVERSITY OF OXFORD.—The Weldon Memorial prize has been awarded to Dr. Major Greenwood. The prize is given once every three years to the person who has published, during the past six years, the most noteworthy contribution to biometric science.

MEDICO-LEGAL SOCIETY.—A meeting will be held at 11, Chandos-street, Cavendish-square, London, W., on Tuesday, March 16th, at 8.30 P.M., when Dr. Knyvett Gordon will read a paper on Fur Dermatitis.

HARVEIAN SOCIETY.—An ordinary meeting of this society will be held at Paddington Town Hall on Thursday, March 18th, at 8.30 P.M., when there will be a discussion on the Use of Ultra-violet Rays in Medicine and Surgery, to be opened by Dr. Leonard Hill, followed by Dr. W. T. G. Pugh.

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES.—On March 26th a meeting is to be held at 11, Chandos-street, London, W., at 8.30 P.M., when Dr. George Riddoch and Dr. P. Panton will contribute papers on Marriage and Syphilis. Consideration of this subject will be resumed at the same hour on April 30th, when the speakers will be Dr. Lacapere and Dr. R. C. Jewesbury.

CONFERENCE ON MATERNITY AND CHILD WELFARE. The fourth English-speaking conference on Maternity and Child Welfare is to be held, in connexion with the National Baby Week celebrations, at the Caxton Hall, Westminster, from July 5th–7th. The main subjects of discussion will be the care of the toddler, the care of the mother (expectant, at confinement, nursing, postnatal), and the father's part in the child welfare movement. There are to be lectures, film displays, an exhibition, social functions, and visits to child welfare institutions. Applications for tickets should be addressed to the hon. secretary, National Association for the Prevention of Infant Mortality, Carnegie House, 117, Piccadilly, London.

SCHOLARSHIPS AND GRANTS FOR SCIENTIFIC RESEARCH.—The Council of the British Medical Association is prepared to receive applications for an Ernest Hart Memorial Scholarship of £200 per annum, for the study of some subject in the department of State Medicine, and for three research scholarships, each of £150 per annum, for research into some subject relating to the causation, prevention, or treatment of disease. Each scholarship is tenable for one year, from Oct. 1st, 1926. A scholar may be reappointed for not more than two additional terms, and may hold a junior appointment at a university medical school or hospital, provided that the duties do not interfere with his work as a scholar. The Council will also receive applications for grants for the assistance of research into the causation, treatment, or prevention of disease. Preference will be given, other things being equal, to members of the medical profession and to applicants who propose as subjects of investigation problems directly related to practical medicine. Applications for the scholarships and grants must be made in proper form before June 5th. The conditions of their award are stated in the regulations, which may be had from the Medical Secretary, British Medical Association House, Tavistock-square, London, W.C. 1.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION.—Mr. H. W. Carson will lecture for the Fellowship on Hernia on Thursday, March 18th, at 5 P.M., in the lecture hall of the Medical Society, 11, Chandos-street, London, W. This lecture will be free to members of the medical profession. From March 15th to 27th the Brompton Hospital will hold an all-day course dealing with various forms of pulmonary diseases by demonstration, lecture, and operation. At the London School of Hygiene and Tropical Medicine demonstrations will be given twice weekly in the afternoons by Dr. G. C. Low and Dr. P. H. Manson-Bahr, from March 16th, for four consecutive weeks. For the convenience of general practitioners the Hampstead General Hospital has organised an afternoon course (4.30 to 6) to cover systematic teaching in all departments. From April 14th to May 5th Dr. C. B. Heald will give four lecture-demonstrations at the Royal Free Hospital on successive Wednesdays at 5.15 P.M. on the Recent Advances in Medical Electrical Treatment. An intensive post-graduate course in proctology is to be given at St. Mark's Hospital from April 19th to 24th. Sessions will be from 10.30 A.M. to 6 P.M. daily, including Saturday. Early application is requested, as the course will not be given unless ten entries are received by April 12th. Copies of all syllabuses, of the general course programme, and of the *Post-Graduate Medical Journal*, may be had on application to the Secretary of the Fellowship, at 1, Wimpole-street, London, W. 1.

ROYAL FREE HOSPITAL EXTENSION.—A new wing is to be added at an estimated cost of £50,000.

KING'S COLLEGE HOSPITAL.—It is intended during the year to open another ward containing at least 24 beds. The beds available for general patients now number 267 out of a total of 388, but 63 are available for paying patients.

SOCIETY FOR THE STUDY OF INEBRIETY.—The annual meeting of this society will be held at 11, Chandos-street, Cavendish-square, London, W., on Tuesday, April 13th, at 4 P.M. After the election of officers Sir William Willcox will open a discussion on the Prevention and Arrest of Drug Addiction.

THE LATE MR. W. PERMEWAN.—We regret to announce the death on March 9th, at Liverpool, at the age of 61, of Mr. William Permewan, consulting surgeon to the Royal Southern Hospital, and lecturer in laryngology in the University of Liverpool.

NORTH-WESTERN TUBERCULOSIS SOCIETY. — A meeting of this society will be held in the surgical theatre of the Medical School, Liverpool, on Thursday, March 18th, at 3 P.M., when Dr. J. G. Adami, the Vice-Chancellor of the University, will read a paper. Medical practitioners and students are cordially invited.

LONDON HOSPITAL MEDICAL COLLEGE. — The Hutchinson Triennial Prize of £60 will be awarded to a qualified student of the London Hospital, who has been registered for not more than 10 years, for a dissertation on Suppuration in the Lungs and Pleura, to be sent in not later than March 31st, 1929.

ST. MARY'S HOSPITAL, PADDINGTON.—A "Pound Day" will be held on March 18th, when Princess Marie Louise will receive purses at 3.30 P.M. Members of the Ladies Association will be at the hospital on March 17th and 18th, from 9 A.M. to 7 P.M., to accept gifts in kind. Cheques or money may be sent to Mrs. Wilfred Harris, 56, Wimpole-street, London, W. 1.

DISTRICT NURSING IN LONDON.—The Central Council for District Nursing in London reported at its annual meeting that in the Administrative County of London there is one district nurse for every 18,120 of the population. No further provision can be made at present owing to lack of money, but extensions are taking place in Greater London.

CHELSEA CLINICAL SOCIETY.—A meeting of this society will be held on Tuesday, March 16th, at 8.30 P.M., at the Florence Restaurant, Rupert-street, London, W., when there will be a discussion on Spa Treatment. Amongst the speakers will be Dr. W. Edgecombe, Dr. Malcolm Campbell, Dr. Matthew B. Ray, Dr. Violle (Vittel), Dr. Debidour (Mont d'Or), and Dr. Ferreyrolle (La Bourboule). Dinner will be served at 7.30 P.M., before the meeting.

ROYAL INSTITUTE OF PUBLIC HEALTH.—A congress will be held at Bristol from May 19th to 24th (Whitsuntide). An interesting and varied programme has been prepared; the railway companies have agreed to reduce the fares of those attending the congress, and hotel or boarding-house accommodation can be arranged for early applicants. Information may be had from the hon. secretary of the Royal Institute, 37, Russell-square, London, W.C. 1.

SOCIETY OF MEDICAL OFFICERS OF HEALTH.—A meeting of this society will be held at 1, Upper Montague-street, Russell-square, London W.C., on Friday, March 19th, when there will be a discussion on Cancer from the point of view of: (*a*) public health administration (Dr. W. D. Champneys); (*b*) the surgeon (Prof. G. E. Gask); (*c*) the research worker (Dr. W. D. Newcomb); (*d*) the general practitioner (Dr. F. E. Allen). Others who will take part in the discussion are Mr. C. J. Bond and Lieut.-Col. A. B. Smallman (Ministry of Health). The President (Dr. G. F. Buchan) will take the chair at 5 P.M., and the meeting will be open to any member of the profession.

THE LATE DR. LEIGH COX.—Dr. Wilfred Leigh Cox, who died on Feb. 28th of blood poisoning after a ten day's illness, came of a family with a medical tradition. His father is Dr. Percy Cox, of Ealing, and his grandfather practised in Manchester. Dr. Cox, who was only 38 years of age, was born at Bowdon in Cheshire, and studied at Manchester and the Middlesex Hospital, where he qualified in 1915. In the early days of the war he was attached to the Anglo-French American Hospital in Paris. Returning to England in 1916, he offered his services again to the R.A.M.C., but was refused on account of ill-health. He freed another medical man for war service and was granted an hon. commission in the R.A.M.C. When the war was over Dr. Cox settled in practice at Southbourne, Hampshire, where he earned a high reputation. His funeral, on March 3rd, was attended by a large gathering of friends.

JAMES MACKENZIE INSTITUTE FOR CLINICAL RESEARCH.—A post-graduate course of 50 lectures and demonstrations for general practitioners will be held at the Institute, St. Andrews, from June 14th to 30th. Particulars may be had from the Secretary.

NOTTINGHAM MEDICO-CHIRURGICAL SOCIETY.—On Feb. 18th Dr. Leonard Williams read a paper on Endocrinology and Old Age, and on Feb. 25th Sir George Newman addressed the Society on the Relation of the State to Medicine.

HOSPITAL, HEALTH, NURSING, AND MIDWIFERY EXHIBITION AND CONFERENCE.—A section dealing exclusively with the work of voluntary organisations is to be included at the annual conference and exhibition to be held from April 12th to 16th, from noon till 8 P.M. daily, at the Central Hall, Westminster.

COURSE IN HOSPITAL ADMINISTRATION. — Dr. E. W. Goodall, medical superintendent, will begin a course on hospital administration at the North-Western Hospital, Metropolitan Asylums Board, on April 8th. The course, which is designed for candidates for the D.P.H. and will include clinical instruction in infectious fevers, will continue for three months, on Mondays and Thursdays at 4.45 P.M. and on alternate Saturdays at 10.30 A.M.

BRITISH SOCIAL HYGIENE COUNCIL. — A new quarterly review called *Health and Empire*, published for the Council by Constable and Co., is to appear this month, and will appeal to the public as well as to medical and social workers. It will describe experiments in educational methods, and its aim is to correlate new developments in psychology, biology, and physiology with special social problems.

HOME FOR NEW HEALTH SOCIETY.—Mrs. Henry Allhusen, late of Stoke Court, Stoke Poges, has given £4000 to establish a National Home of Health as the head-quarters of the New Health Society. The gift is made so that the society's central offices shall be "a lasting memorial to her husband and her children, Harry and Elizabeth, in the hope that the work of the society, in its teachings of the laws of health to the public, will preserve the lives of others equally dear to their relatives and friends."

DISTRIBUTION OF INSULIN BY LOCAL AUTHORITIES. The Scottish Board of Health has sent out circulars to local authorities reminding them that they are now empowered to provide insulin for diabetics in their areas who cannot afford to buy it for themselves. Many authorities have, in fact, long been making this provision, and the powers now conferred by the Public Health (Scotland) Amendment Act, 1925, retrospectively cover such arrangements as they may have made since March 1st, 1924, subject to the approval of the Board of Health. Cost has hitherto been a serious consideration in the progress of these schemes, and the board has now made arrangements with manufacturers whereby local authorities can get their insulin at reduced rates. The special price fixed is 2*s.* per 100 units, plus postage; this arrangement applies to the insulin sold by Boots Pure Drug Co., Ltd., British Drug Houses, Ltd., and Burroughs, Wellcome and Co. Local authorities who want to get their insulin at this rate are asked to send their orders to the Board, stating the quantity and make of insulin required. The orders will then be sent on to the manufacturers, who will forward the insulin direct, but will send their account to the Board. Every six months the Board will send on the total account to the local authority.

THE LATE DR. F. J. TRESILIAN.—Dr. Frederick James Tresilian, who died after a short illness at Enfield on Feb. 14th, at the age of 64, came of the Cornish family Tresilian of that ilk. He was brought up in Ireland and was educated at Midleton College and Queen's College, Cork, where he graduated as M.D. and M.Ch. in 1885. Two years later he became M.R.C.P. Edin. and for some time acted as assistant to a doctor in Wales. In 1890 he joined Dr. Briand in practice at Enfield, and from 1894 until quite recently worked without assistance there. In his early days at Enfield he also acted as clinical assistant at the ear, nose and throat, and eye departments at the Prince of Wales's Hospital, Tottenham, and also at the Central London Ear, Nose and Throat Hospital. In 1902 he became F.R.C.P. Edin. Dr. Tresilian was a keen and energetic member of the British Medical Association and of the North-East London Clinical Society. He was a medical referee of the Prudential Assurance Company and for many years served as honorary medical officer to the Enfield War Memorial Hospital. At his funeral a remarkable tribute was paid to his memory by a large gathering of those who had reason to admire him and regret his death. Dr. Tresilian leaves a widow, two daughters, and a son. His elder daughter belongs to the medical profession.

MENTAL AFTER-CARE ASSOCIATION.—The annual meeting will be held on Tuesday, March 16th, at 3 P.M., at the Fishmongers' Hall, London Bridge, E.C., when Sir Charles C. Wakefield, the President, will take the chair, and the following will speak: Sir William Collins, M.D., Dr. Nathan Raw, Mr. Lionel Faudel Phillips, Capt. A. O. Goodrich, Sir Maurice Craig, M.D., Dr. R. Percy Smith, and Dr. R. C. Turnbull. Members of the public are invited to be present, and information can be obtained from the secretary, Miss Vickers, Church House, Westminster, S.W. 1.

LEEDS WORKPEOPLE'S HOSPITAL FUND.—This fund has contributed upwards of half a million pounds to medical charities in the city and district since it was started 40 years ago. The sum collected in 1925 was a new record in its history. The contributions reached over £42,000, most of which was raised by weekly collections of workers' pennies in the factories, workshops, and foundries of the city. The principal grants were £21,500 to the Leeds General Infirmary, £3225 to the Public Dispensary, £2687 to the Hospital for Women and Children, £1075 to the Maternity Hospital, £860 to the District Nursing Association, and £335 to the Jewish Hospital. The fund also maintains three convalescent homes, two for women and one for men, for the use of workers whose health has failed. The cost of their maintenance last year was £8240.

ROYAL MEDICAL BENEVOLENT FUND GUILD.—The annual meeting was held on Feb. 27th at 47, Brook-street. Lady Bland-Sutton presiding over a very large assembly of subscribers and their friends. Lady Fripp, chairman of the council, reported a great increase in activity, necessitating the appointment of a general secretary-accountant to replace Miss Thomson, whose resignation after 15 years' zealous work was deeply regretted. Reports were given of the development of the various provincial branches of the Guild, some of which, notably Edinburgh, Bath, Cardiff, Glasgow, Reigate and Redhill, and Preston, had made good progress in obtaining new subscribers or in raising funds by means of entertainments or sales. A new branch had been formed at Great Yarmouth. Among the London districts Hampstead and St. Pancras were prominent, and five new districts had been formed—North London, Harrow, Pinner, Barnes, and Mortlake. In the unavoidable absence of Mrs. Scharlieb, M.D., the report of the hon. treasurer was read by Lady Bradford. She said that though donations this year had amounted to the record total of £3753, the amount (£1288) derived from regular annual subscriptions—which formed the only really reliable source of income—did not meet the often inadequate help given to older beneficiaries, quite apart from the money required for educational grants. The case committee had appealed for a 50 per cent. increase in the monthly maintenance grants to the older beneficiaries, and new subscribers were urgently needed to this end. Mrs. A. Ormond, chairman of the case committee, in a moving report of the cases relieved, gave examples of the benefits conferred on the younger persons—from a grant to enable a girl left fatherless to complete her medical studies, to the provision of one square meal per day to a lad apprenticed to a firm of engineers. During 1925 24 girls and 16 boys had been educated entirely or partially at the cost of the Guild. Observation of children living in homes where money is pitifully short has convinced the committee that where possible boarding schools are to be preferred. The depressing atmosphere of such homes, a too limited and monotonous diet, and the absence of any money even for trivial amusements such as bus rides, are bad for children, and the care-free atmosphere of school life is much more desirable. Mr. Pett Ridge and Miss Madge Titheradge spoke eloquently on behalf of the Guild, and cordial votes of thanks were given to Sir John and Lady Bland-Sutton and to the officers of the Guild. At the invitation of the Medical Insurance Agency, which has this year again presented a donation of £525, a representative of the Guild, in the person of Mrs. A. Ormond, has been appointed to serve on the subcommittee of the agency dealing with the education of girl beneficiaries. Legacies received during the year include £100 from the late Miss E. J. Humby, £200 from the George Macbain Trust, and £300 from the late Miss Constance Turner. The Stock Exchange Male Voice Choir again in 1925 and in 1926 devoted the proceeds of their annual concert to the Guild, and in 1925 the sum accruing from the third of the successful golf competitions organised by Lady Rigby, under the auspices of the Ladies' Medical Golfing Society, completed the £250 for an annuity scholarship which these competitions were started to provide. Special efforts such as these are of value not only for the money they bring in but for the interest they excite in those previously unfamiliar with the work of the Guild. Those who are prepared to help in propaganda work in any form, or to send parcels of old clothes, are asked to communicate with the Secretary of the Guild, 58, Great Marlborough-street, London, W.

OXFORD OPHTHALMOLOGICAL CONGRESS.—The Congress will assemble at Keble College on the evening of Wednesday, July 14th, and the meeting will be held on July 15th, 16th, and 17th. On July 15th there will be a discussion on Sympathetic Ophthalmia, to be opened by Mr. Malcolm L. Hepburn, Mr. S. H. Browning, and Dr. T. Harrison Butler. The Doyne memorial lecture will be delivered on July 16th, by Dr. Thomson Henderson, on the Anatomy and Physiology of Accommodation in Mammalia. One afternoon will be devoted to demonstrations in the scientific and commercial museums. Further information may be had from the hon. secretary at Salisbury House, Wolverhampton.

DR. J. B. HURRY'S GIFTS TO READING.—Dr. J. B. Hurry, the author of "Vicious Circles in Disease," which has been translated into French, Spanish, and Italian, and has gone through three editions in this country, is leaving Reading for Bournemouth after 40 years of active interest in the town both as a medical man and, quoting the farewell words of the mayor, "one of Reading's best citizens." Dr. Hurry has given the town as a parting gift the last of a series of ten pictures illustrating the history of Reading Abbey, which he has had painted with the object of stimulating civic pride and local patriotism. The last picture has been painted by Mr. Stephen Reid and shows the Parliament of Henry VI. at Reading Abbey, A.D. 1453. The ten pictures are housed in the Reading Art Gallery and make a collection which is perhaps the only one of its kind in this country. The presentation ceremony took place in the Council Chamber of the Reading Municipal Buildings on March 6th. The nine pictures already presented to the town are as follows: The Burial of Henry I., Founder of the Abbey, 1136 (Artist, Harry Morley). The Trial by Combate between Henry of Wessex and Robert of Montfort, 1163 (Harry Morley). The Hallowing of the Abbey Church by Archbishop Thomas Becket, 1164 (Stephen Reid). The Visit of Heraclius, Patriarch of Jerusalem, to Henry II., 1185 (Stephen Reid). "Summer is I-cumen in," Circa, A.D. 1240 (E. Board). The Marriage of John of Gaunt to Blanche of Lancaster 1359 (E. Boardman Wright). The Election by the Abbot, John Thorne I., of Thomas Clerke to be Mayor of Reading, 1460 (Stephen Reid). The Enthronement of Elizabeth Woodville as Queen of Edward IV., 1464 (E. Board). The Execution of Hugh Faringdon, the last Abbot of Reading, 1539 (Harry Morley).

SUSSEX THROAT AND EAR HOSPITAL.—A good financial position was reported by the governors at the recent annual meeting at Brighton, and it is hoped that the new out-patients' department will be begun this year. During 1925 233 more in-patients were treated at the hospital, the total being 902, and the number of out-patients increased by 217 to 1358. Contributions paid voluntarily by patients amount to nearly £1000, of which over £635 came from in-patients. The hospital has now the support of the Brighton, East Sussex, West Sussex, and Lewes education committees, and also continues to have the support of the Sussex Provident Scheme.

## INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED FEB. 27TH, 1926.

*Notifications.*—The following cases of infectious disease were notified during the week:—Small-pox, 292 (last week 242); scarlet fever, 1792; diphtheria, 1244; enteric fever, 43; pneumonia, 1399; puerperal fever, 72; cerebro-spinal fever, 10; acute poliomyelitis, 5; encephalitis lethargica, 44; continued fever, 2; dysentery, 11; ophthalmia neonatorum, 109. There were no cases of cholera, plague, or typhus notified during the week.

Of the 292 cases of small-pox (50 more numerous than in the previous week) 48 were reported from the county of Derby, 38 of these from Derby C.B.; 157 (last week 124) from the county of Durham, 14 being from Gateshead C.B., 25 from South Shields C.B., the remainder from widely scattered urban and rural districts, and including 31 (last week 35) from Blaydon, 14 from Chester-le-Street, and 11 from Houghton-le-Spring; 4 from the county of Lancaster, all at Oldham C.B., a new focus; 43 from the county of Northumberland, 28 of these from Ashington; 3 from the county of Nottingham; 5 from the East Riding of Yorkshire (Kingston-upon-Hull 1); 32 from the West Riding, 23 of these being from Rawmarsh and 5 from Rotherham R.D.

*Deaths.*—In the aggregate of great towns, including London, there were 3 (2) deaths from enteric fever, none from small-pox, 105 (47) from measles, 7 (2) from scarlet fever, 57 (4) from whooping-cough, 56 (18) from diphtheria, 46 (11) from diarrhœa and enteritis under 2 years of age, and 89 (20) from influenza. The figures in parentheses are those from London itself. For the fourth time during the last six weeks the deaths from measles exceeded 100. The mortality from influenza remains practically stationary.

# Medical Diary.

## SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

TUESDAY, March 16th.—5.30 P.M., GENERAL MEETING OF FELLOWS. 8.30 P.M., PATHOLOGY. Annual General Meeting: Election of Officers and Council for 1926–1927. *Papers:* Dr. Paul Fildes: Observations on Tetanus. Sir Lenthal Cheatle: Paget's Disease of the Nipple and Changes in the Underlying Breast. Dr. James Young: Further Study of the Micro-Parasite Isolated from Carcinoma by Young, Glover and Colleagues, Stearn, Sturdivant and Stearn, and others.

WEDNESDAY.—5 P.M., HISTORY OF MEDICINE. *Papers:* Sir StClair Thomson: Antimonial Cups. Mrs. Lindsay: Dentistry in the Eighteenth Century.

THURSDAY.—5 P.M., DERMATOLOGY. (Cases at 4 P.M.) *Cases:* Dr. S. E. Dore: (1) Xanthoma Tuberosum Multiplex. (2) Gaucher's Disease with Cutaneous Lesions (with Dr. de Wesselow). Other cases will be shown.

FRIDAY.—8.30 P.M., ELECTRO-THERAPEUTICS. *Paper:* Dr. R. O. Moody (California): The Normal Position of the Abdominal Viscera and Enteroptosis.

MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, W.

MONDAY, March 15th.—9 P.M., Dr. E. Farquhar Buzzard: Principles of Treatment in Relation to Diseases of the Nervous System (Third Lettsomian Lecture.)

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE.

THURSDAY, March 18th.—8.15 P.M. A Laboratory Meeting at the Royal Army Medical College, Grosvenor-road, Millbank, S.W. The following, amongst others, will give demonstrations: Prof. Warrington Yorke (on behalf of Prof. Blacklock), Dr. P. A. Buxton, Colonel Clayton Lane, Colonel W. P. MacArthur, Dr. A. C. Stevenson, Drs. J. G. Thomson and A. Robertson, Drs. C. M. Wenyon and H. H. Scott.

## LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.

TUESDAY, March 16th.—5 P.M., Dr. Bernard Hart: Development of Psychopathology, and its Place in Medicine (second Goulstonian Lecture).

THURSDAY.—5 P.M. (last Goulstonian Lecture).

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn-fields, W.C.

MONDAY, March 15th.—5 P.M., Mr. Shattock: Some Bone Tumours.

FRIDAY.—5 P.M., Sir Arthur Keith: Hydrocephaly and Encephalocele.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY, March 15th, to SATURDAY, March 20th.—Fellowship of Medicine lecture, at the Medical Society, 11, Chandos-street, W. Thursday, at 5.30 P.M., Mr. H. W. Carson: Hernia. Free to all members of the medical profession.—CHELSEA HOSPITAL FOR WOMEN, Arthur-street, S.W. Post-graduate Course in Gynæcology. Daily operations, lectures, and demonstrations.—HAMPSTEAD GENERAL HOSPITAL, Haverstock-hill, N.W. Two weeks' course, 4.30 to 6 P.M., for Practitioners. Demonstrations, &c., in various departments of the Hospital throughout the course.—HOSPITAL FOR DISEASES OF THE CHEST, Brompton. All-day course for two weeks. Operations, lectures, and demonstrations from 10.30 A.M.—LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE, Endsleigh-gardens, N.W. Tuesday and Thursday, 2 P.M., Dr. Low and Dr. Manson-Bahr: Special lecture-demonstration, illustrated by cases in hospital. Further information from the Secretary of the Fellowship of Medicine.

NATIONAL HOSPITAL FOR THE PARALYSED AND EPILEPTIC, Queen-square, Bloomsbury, W.C. 1.

POST-GRADUATE COURSE: FEBRUARY–MARCH, 1926.

CLINICAL LECTURES AND DEMONSTRATIONS.

MONDAY, March 15th.—2 P.M., Out-patient Clinic: Dr. Hinds Howell. 3.30 P.M., Mental Deficiency: Dr. Birley.

TUESDAY, March 16th.—2 P.M., Out-patient Clinic: Dr. Walshe. 3.30 P.M., Cerebral Vascular Disease, I.: Dr. Adie.

THURSDAY, March 18th.—2 P.M., Out-patient Clinic: Dr. Kinnier Wilson. 3.30 P.M., Epilepsy: Dr. Martin.

FRIDAY, March 19th.—2 P.M., Out-patient Clinic: Dr. Adie. 3.30 P.M., The Cerebro-spinal Fluid in Meningitis: Dr. Greenfield.

The fee for the Course, including Pathology lectures, is £5 5s. For those who hold Perpetual Tickets the fee is £3 3s.

Mr. Armour and Mr. Sargent operate at the Hospital on Tuesday and Friday mornings at 9 A.M., or at such other times as may be announced.

Any part of the Course may be taken separately. Special arrangements will be made for those unable to take the whole Course.

Fees should be paid to the Secretary of the Hospital at the Office on entering for the Course.

J. G GREENFIELD, Dean of Medical School.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.

MONDAY, March 15th.—10 A.M., Surgical Out-patients: Mr. W. E. Tanner. 10.30 A.M., Gynæcological Operations: Mr. A. E. Giles: Throat, Nose and Ear Operations: Mr. W. Ibbotson. 2 P.M., Medical, Surgical, and Gynæcological Clinics, Operations. 6.30 P.M., Venereal Department.

TUESDAY,—2 P.M., Medical, Surgical, Throat, Nose and Ear Clinics, Operations. 4.30 P.M., Dr. J. B. Alexander: Rheumatoid Arthritis.

WEDNESDAY.—10.30 A.M., Surgical Operations: Mr. E. Gillespie. 2 P.M., Medical, Eye, and Skin Clinics, Operations. 5.30 P.M., Venereal Department.

THURSDAY.—10.30 A.M., Dental Out-patients: Mr. E. S. Pierrepont. 2 P.M., Medical Surgical, and Throat, Nose and Ear Clinics, Operations. 5 P.M., Operations.

FRIDAY.—10.30 A.M., Eye Operations: Mr. N. Fleming. 2 P.M., Surgical, Medical, and Children Clinics, Operations. 3 P.M., Gynæcological Clinic. 6.30 P.M., Venereal Department.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.

FRIDAY, March 19th.—4 P.M., Dr. Nicol Rankin: Purulent Rhinitis.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.

THURSDAY, March 18th.—4 P.M., Mr. Barrington-Ward: Empyema.

LONDON SCHOOL OF DERMATOLOGY, St. John's Hospital, 49, Leicester-square, W.C.

TUESDAY, March 16th.—5 P.M., Dr. Haldin-Davis: Leukæmia Cutis. Mycosis Fungoides.

THURSDAY.—5 P.M., Dr. Ingram: Pathological Demonstration. (Chesterfield Lectures.)

UNIVERSITY OF SHEFFIELD POST-GRADUATE CLINICS.

FRIDAY, March 19th.—3.30 P.M. (at the Royal Hospital). Dr. Abercrombie: Types of Paralysis in Childhood and their Treatment.

MANCHESTER ROYAL INFIRMARY POST-GRADUATE LECTURES.

TUESDAY, March 16th.—4.15 P.M., Dr. W. Fletcher Shaw: Hæmorrhage about the Menopause.

FRIDAY.—4.15 P.M., Mr. P. R. Wrigley: Demonstrations of Surgical Cases.

# Appointments.

DOUGLAS, CHARLOTTE A., M.D. Glasg., has been appointed Medical Officer to the Scottish Board of Health.

GILMORE, EDWARD R. W., M.B., Ch.B., D.P.H. Vict., D.P.H. Lond., D.T.M. Liverp., Assistant Medical Officer of Health for the County Borough of Southampton.

HUNTER, A. E., M.D. Edin., one of the Medical Referees under the Workmen's Compensation Act for the Falkirk District.

MITCHELL, GODFREY W., M.D., B.Ch., D.P.H. Camb., D.M.R. & E., Assistant Medical Officer in charge of the X ray department, St. Mary's Hospital.

Metropolitan Asylums Board: BORTHWICK, G. A., M.D., Ch.B. Edin., D.P.H., D.T.M. & H., and ROLLESTON, J. D., M.D., Ch.B. Oxf., Medical Superintendents in Infectious Hospital Service.

Manchester Royal Infirmary: BRAMWELL, J. C., M.D. Manch., M.R.C.P. Lond., an Honorary Assistant Physician; TYLECOTE, F. E., M.D. Manch., Physician.

Salford Royal Hospital: ADDIS, WILLIAM ROBERT, M.B., Ch.B. Edin., Honorary Gynæcologist; COLLINS, BEATRICE L., M.R.C.S., L.R.C.P., Radiologist.

# Vacancies.

*For further information refer to the advertisement columns.*

*Birmingham General Hospital.*—Asst. Surg. to Throat and Ear Dept. £50.

*Bradford, Grassington Sanatorium.*—Med. Supt. £700.

*Brighton, Royal Sussex County Hospital.*—H.S. £150. Also Hon. Dermatological Clin. Asst.

*Bristol Mental Hospital.*—Sen. Asst. M.O. £550.

*Cardiff City Mental Hospital, Whitchurch, near Cardiff.*—Res. Clin. Asst. for six months. 50 guineas.

*Cardiff, King Edward VII. Welsh National Memorial Association.*—Two Area Tuberculosis P.'s. Each £696.

*Central London Ophthalmic Hospital, Judd-street, St. Pancras, W.C.*—Sen. and Jun. H.S. At rate of £100 and £50 respectively.

*Chelsea Hospital for Women, Arthur-street, Fulham-road, S.W.*—Anæsthetist. £21.

*City of London Maternity Hospital, City-road, E.C.*—Asst. Res. M.O. At rate of £80.

*Denbigh, North Wales Sanatorium, Llangwyfan, near Denbigh.*—Third Asst. Res. M.O. £200.

*Dewsbury County Borough.*—Asst. Sch. M.O. and Asst. M.O.H. £600.

*Dreadnought Hospital, Greenwich, S.E.*—H.S. and H.P. Each at rate of £110.

*Elizabeth Garrett Anderson Hospital, 144, Euston-road, N.W.*—Asst. Med. O. Ven. Dis. Dept. £1 1s. per attendance. Also two Anæsthetists. At rate of £10 10s.

*Evelina Hospital for Children, Southwark, S.E.*—H.S. At rate of £120.

*Folkestone, Royal Victoria Hospital.*—Res. M.O. At rate of £150.

*Fulham School Medical Treatment Centre.*—Ophth. S. £50 per quarter.

*Halifax Royal Infirmary.*—Third H.S. At rate of £150.

*Hampstead Borough.*—Four Consulting Obstetricians.

*Hartlepool Borough.*—M.O.H., &c. £800.

*Herts County Mental Hospital, Hill End, St. Albans.*—Sen. Asst. M.O. £600.

*Hospital for Sick Children, Great Ormond-street, W.C.*—H.S., H.P., and Asst. Cas. O. £50 in each case.

*Hull City and County of Kingston-upon-Hull Maternity and Child Welfare Dept.*—Asst. M.O. £600

*Liverpool Eye and Ear Infirmary, Myrtle-street.*—Hon. Asst. S. to Aural Dept.

*Liverpool Port Sanitary Authority.*—Asst. Port M.O. £700

*London Lock Hospital, 283, Harrow-road, W.*—Second H.S. £150.

*London School of Hygiene and Tropical Medicine, 23, Endsleigh-gardens, W.C.*—Asst. in Dept. of Entomology. £500.

*Macclesfield, Cheshire Mental Hospital, Parkside.*—Locum Tenens Asst. M.O. At rate of £350.

*Manchester Committee on Cancer.*—Pathologist. £1000.

*Manchester Radium Institute.*—Anæsthetist. £100.

*Manchester, St. Mary's Hospitals.*—Three H.S.'s. Each at rate of £50.

*Metropolitan Asylums Board.*—Asst. Pathologist. £700.

*Mount Vernon Hospital, Northwood, Middlesex.*—Hon. Asst. Actino-Therapeutist.

*National Hospital for the Paralysed and Epileptic, Queen-square, W.C.*—Orthopædic S.

*Northampton General Hospital.*—Hon. Asst. S.

*Norwich, Norfolk and Norwich Hospital.*—H.S. £120.

*Queen Mary's Hospital for the East End, E.*—Hon. Asst. Obstet. S.

*Queen's Hospital for Children, Hackney-road, Bethnal Green, E.*—Res. M.O. £200.

*Radcliffe Urban District.*—M.O.H. and Sch. M.O. £800.

*Reading, Royal Berkshire Hospital.*—H.P. £150.

*Redhill, Surrey, Royal Earlswood Institution.*—Jun. Asst. M.O. £250.

*Rochdale Infirmary and Dispensary.*—Jun. H.S. £200.

*Royal Northern Hospital, Holloway, N.*—M.O. to Out-patients. At rate of £125.

*St. Andrew's Hospital, Devons-road, Bow, E.*—Med. Supt. £1000.

*St. Paul's Hospital for Skin and Genito-Urinary Diseases, Endell-street, Holborn, W.C.*—H.S. £200.

*St. Thomas's Hospital.*—P.

*Southampton County Borough.*—Tuberculosis O. £750.

*South London Hospital for Women, South Side, Clapham Common, S.W.*—H.P. and three H.S.'s. All at rate of £50.

*West London Hospital, Hammersmith-road, W.*—Hon. Med. Radiologist.

*Willesden Urban District Council.*—Consulting Ophth. S. 4 guineas per session.

# Births, Marriages, and Deaths.

## BIRTHS.

DARBYSHIRE.—On Feb. 24th, to Dr. Florence Darbyshire, wife of Dr. F. J. Darbyshire, Westbourne Park-road, W.—a son.

HARRIES.—On the 7th inst., at a nursing home, the wife of Eric H. R. Harries, M.D. Lond., City Hospital, Little Bromwich, Birmingham—a daughter.

HOLMES.—On March 2nd, at Tower House, Burgess Hill, Sussex, the wife of Lieut.-Colonel J. M. Holmes, I.M.S. (retd.), of a daughter.

HOWARTH.—On March 6th, at Devonshire-place, W., the wife of Walter Howarth, F.R.C.S., of a son.

JACQUES.—On Feb. 27th, at a nursing home, Clifton, Bristol, to Evelyn Jacques, wife of Frederic Jacques (both of the Malayan Medical Service)—twin daughters.

MCFADYEAN.—On March 6th, at Herne-hill, S.E., the wife of Kenneth McFadyean, M.R.C.S., L.R.C.P., of a son.

## MARRIAGES.

KILNER—BRENNAN.—On Feb. 23rd, at St. James's Church, Spanish-place, T. Pomfret Kilner, F.R.C.S., to Florence, widow of Lieut. J. Brennan, Lancs Hussars.

WIGRAM—WOOLFE.—On Feb. 22nd, at the St. John's Wood Synagogue, N. G. Wigram, F.R.C.S., to Dorothy, second daughter of Mr. and Mrs. John Woolfe, of Finchley-road, London.

## DEATHS.

LEIGH COX.—On Feb. 28th, at a Boscombe nursing home, Wilfred Leigh Cox, M.R.C.S., L.R.C.P., of Beresford-road, West Southbourne.

SULLIVAN.—On Feb. 26th, at Bournemouth, Dr. W. C. Sullivan, Medical Superintendent, Broadmoor Criminal Lunatic Asylum, aged 57 years.

SURRAGE.—On March 7th, at King's College Hospital, Harold James Rocke Surrage, M.R.C.S., L.R.C.P., of George-street, Portman-square, in his 32nd year.

YELF.—On Feb. 28th, at Hemel Hempstead, John Burnet Yelf, M.R.C.S., L.R.C.P. (late of Shipston-on-Stour).

*N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.*

# Notes, Comments, and Abstracts.

## CHILD WELFARE: REVIEW OF A YEAR'S WORK.

THE annual meeting of the National Baby Week Council was held at Carnegie House, Piccadilly, on March 4th, under the presidency of Dr. Mary Scharlieb. She referred to the still high mortality of infants in the first four weeks of life, to combat which well-qualified doctors, nurses, and midwives were necessary. The Astor challenge shield for the most effective baby week campaign was won by Northampton, and Astor banners by Littlehampton and Arundel and by Wigan, while certificates of merit went to Blackburn, Middleton, East and West Molesey, Rathmines (Dublin), Walsall, and Walthamstow. These were presented by Dr. Scharlieb during the afternoon.

Dr. Eric Pritchard moved the adoption of the annual report. The year's work showed three new features—Baby Sunday, with a mass meeting in the Queen's Hall; the Empire's mother and baby competition; and the first summer school of maternity and child welfare. The motion was seconded by Dr. David Kirkhope and carried, as was the report of the joint honorary treasurers and the balance-sheet introduced by Major C. P. Lovelock.

An address on the Economics of Child Welfare Work was then given by Dr. J. R. Kaye, M.O.H. of the West Riding. There were, he said, two aspects of health services—the positive, dealing with the promotion of health, and the negative, concerned with mortality and morbidity. Prevention or restriction of disease was one of the best ways of promoting health, and of all factors leading to it maternity and child welfare work was perhaps the most fruitful, though the most modern. While we spent every year £1,750,000 on asylums, £750,000 on mental deficiency, and £3,000,000 on tuberculosis, we only spent £1,500,000 on maternity and child welfare, which was preventive work. Welfare centres were not repair shops or surgeries; we wanted them to be attended by well babies and good mothers. The work of health visitors in the homes was of great service in maintaining health. There were 105 centres in the West Riding, and Dr. Kaye reckoned that a centre could be established for £160 and carried on at a cost of £100 year.

The Hon. Mrs. Bernard James then spoke on the Rural Child. People thought of country children as being specially fortunate in the matter of healthy environment, but there was another side to the question. Shortage of houses often meant that two families had to share a cottage, and this created a terrible problem in cases of illness, especially if it was infectious illness. The water-supply was frequently dependent on a well, a pump, or a rain-water tank, and the water might be dirty or contaminated. Many houses had no proper sanitation, and the arrangements were, in some cases, neither clean nor healthy. There were difficulties arising from poverty; the agricultural worker's wage was a tight fit when everybody was well, and it was hard that, if one child needed a little extra, all the others had to go short. There was often no hospital near at hand, and many places had no district nurse, while a doctor was an expensive luxury only resorted to in cases of serious illness. The result was that mothers had no systematic help in regard to their children's health. A good district nurse and midwife was invaluable; most of the 70 district nurses in Buckinghamshire acted also as school nurses and health visitors, and became the trusted friends of the families. There were advantages in having medical officers of the centres from a distance, and it was desirable to have doctors, preferably women, who had specialised in children's work. The right thing was to establish centres in the central villages and send an omnibus to fetch mothers and children from the surrounding districts. This was done in Mrs. James's own district, and the Ministry of Health, after sending down an inspector, had allowed their claim for grant in respect of conveyances.

## THE PREVALENCE OF CANCER.

A LAY correspondent complains that he is confused by reason of statements in the press in regard to medical matters, and asks how he can learn the truth. "On one day," he says, "I am told that cancer is on the increase, and on another that it is no more prevalent now than it was 100 years ago," and he encloses the extracts from the newspapers. We sympathise with our correspondent, who suffers in common with many others, but can only refer him to the official figures of the Registrar-General. Newspaper readers desire sensational statements, and do not fully realise the evil which is done by them. In the matter of cancer, misleading pronouncements may be particularly serious, especially when some method of therapeutics is vaunted. For a sense of false security may be engendered which obstructs that early treatment which is at present the only safeguard. The newspaper extracts which contradicted each other managed to be both wrong.

## A HOSPITAL IN CHINA.

BEFORE his departure from China recently, Dr. R. R. Walker was present at the opening of a new maternity building attached to the Church Missionary Society's hospital at Hinghua (Fukier), with which he has been connected for 18 years. This building was a gift from the people of the city, who had subscribed 50,000 dollars in token of appreciation of the services of Dr. and Mrs. Walker. The Hinghua hospital was founded 30 years ago by the C.M.S., and was for 17 years under the charge of Dr. van Someren Taylor. It has 380 beds, besides 60 beds in the new maternity building, and for a long time Dr. Walker has been the only British doctor there. He has been assisted, however, by five Chinese doctors, three English sisters, 20 Chinese women nurses, and four Chinese men nurses. During the past few years wounded soldiers and bandits have formed a large proportion of his patients, and on several occasions he has been asked by the Governor of the city to act as mediator between opposing forces in the perpetual civil war.

## OPEN-AIR SHELTERS.

THE open-air shelters manufactured by the Papworth Industries, Cambridge, all of which are of good material, are now being sold at prices ranging between £12 and £20. Particularly worthy of notice is the "Country" shelter, which can be made with the roof and front jointed so as to allow the whole structure to be passed through a six-foot doorway, an advantage where there is no side entrance to the garden of a house. The revolving shelter, which turns at a touch, is also a portable building which has decided merits.

Our readers will like to know where useful adjuncts to what is often protracted treatment can be obtained in a form that is available promptly without much expenditure.

## THE LORDSHIP OF THE WORLD.

WE have received this small book dealing with the large subject of the inter-relations of the British Empire, the United States, and Germany (C. J. O'Donnell. London: Cecil Palmer. Pp. 187. 5s.) and find it to be an uncompromising piece of political writing which contains no particular appeal to the medical profession. Many popular views are contravened and much vigorous phraseology is employed in general deductions, which will not always be held justified by the facts, even if it is admitted that the facts are so, or are set out in due proportion. None the less, it is a book which will appeal to a certain mode of thought among medical men, if only because of the many illustrations that are provided in it of the sinister influence of common conceptions, when not founded upon reason. Medical men, whose business it is to be familiar with the mental make-up of their fellows, know perfectly well that the various proceedings and policies denounced whole-heartedly by Mr. O'Donnell did not have their origin in cruelty or malice, but publicists insist so strongly upon the essential malignancy of those to whom they are opposed that readers who do not think acquire passively many contorted views of the world. No doubt there is much in what Mr. O'Donnell has written that we all ought to think about, but it would be unwise to adopt his outlook without probing his facts, or to endorse his conclusions without inquiry into their logical basis.

## AN AID TO THE STUDY OF MIDWIFERY.

Miss Olive Haydon, a member of the Central Midwives Board, has written a short guide [1] to those specimens in the museum of the Royal College of Surgeons of England which are likely to interest and instruct students of midwifery. It is intended primarily for midwives, but if it encourages medical students to make more use of the admirable material on view in the museum it will be doing a service to them also. It is undoubtedly convenient to carry such a guide on a visit—or preferably on several visits—to the museum, and there is no doubt that anyone who examines the exhibits to which it refers will afterwards find it much easier to take in the mass of facts which the student is asked to learn within a few months. We doubt whether all medical students understand that the museum is open to them. Those who never go to the College except under the stress of examination are certainly unwise, for some of the collections are admirably adapted to the student's needs and are beautifully arranged.

[1] The Midwives' Guide to the Museum of the Royal College of Surgeons. The Office of Nursing Notes, 12, Buckingham-street, W.C. 2. Pp. 63. 1s.

## A CONVALESCENT HOME FOR THE MIDDLE-CLASSES.

A CONVALESCENT home has been opened at the New Hall, Dovercourt, to cater for those who cannot afford the large fees asked in nursing homes, and do not care to go to those supported by charity. It is open to all employees of any place of business, banks, works, or to the "new poor." The home, situated in its own grounds, overlooks the sea, and is designed to be not an institution but a pleasant home, where everything is done for the comfort of the patient. The rooms are large and airy, and books, papers, and games are supplied. The staff is adequate, and the home is visited by Dr. Ford Porter, medical officer of health of the district. The price charged is 30s. per week inclusive. Applications for admission should be made to the London office to Captain Claremont, R.N., 52, Abingdon-villas, Kensington, W. 8.

We bring the home before our readers with the belief that many of them will know patients who might be greatly benefited by the opportunities offered. It need hardly be said that the extraordinary moderation of the fee is due to the fact that the whole service and administration are supplied gratuitously by Captain Claremont and his wife and assistants.

## ERYTHEMA NODOSUM AND TUBERCULOSIS

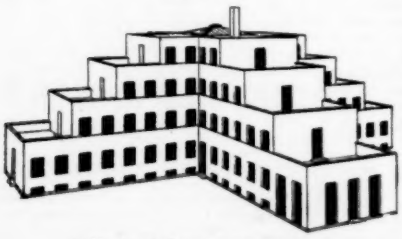
IN the *Semana Medica* (Buenos Aires) of Jan. 7th Prof. G. Alforo summarises his 30 years' experience of erythema nodosum. His conclusions are as follows: (1) Erythema nodosum may be the expression of various infections but not of any one in particular. (2) Nevertheless, the almost constant coincidence of positive tuberculin reaction and the presence of Koch's bacilli in some nodules, shown by staining or inoculation, prove that it is usually a manifestation of tuberculosis. (3) Not infrequently the general symptoms (loss of appetite, weakness, and fever) which precede and go with the eruption suggest a larval or attenuated tuberculosis. (4) In some cases observed by Prof. Alforo erythema nodosum has shown itself as the final episode in a febrile attack lasting some weeks, and has cut short a budding tuberculosis in children with a positive tuberculin reaction and enlargement of the tracheo-bronchial glands. In such cases, he states, it seems to be an exanthem of fixation of the tuberculous virus and to determine favourably a miliary infection probably attenuated.

## TERRACED BUILDINGS.

THE drawings reproduced represent an ingenious type of building devised by Mr. Gjerlov-Knudsen, an architect of Copenhagen. The artistic merits of the design may not alone be sufficient to commend it, but there are certain very obvious advantages in this kind of city dwelling which make it worth consideration.

The figures show a block of flats in perspective and in cross-section. The building is in the form of a cross, and it is built in terraces. Each arm of the cross is arranged to form a complete dwelling or flat, and it will be clear from the pictures that the size of the wings or flats diminishes towards the apex of the pyramid, until at the top they become very small indeed. In the centre of the cross there is a communal staircase or lift, and presumably the occupants of the apartments arrange themselves in layers according to financial status. In the building specified there are five rooms, together with a small room and a bathroom, in the first-floor flats; three rooms with a small room and a bathroom in the second-floor flats; and two rooms and a shower bath in the third-floor flats. Each kitchen is connected with the basement through a special shaft with a transport lift. Refuse may be transported through this in special baskets. There are isolated rooms in the basement for dustbins, and also the necessary rooms for washing and drying, besides storerooms, bicycle-rooms, and a lumber-room for each apartment. "The plans especially intended for England are furnished with fireplaces meant for gas, and, in some cases, coal fires."

FIG. 1.

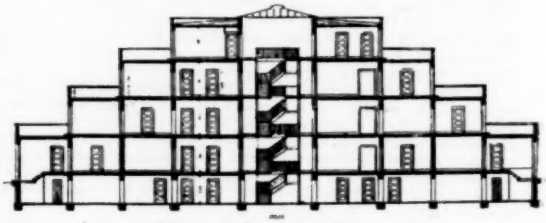


A block of flats in perspective.

It is easy to see the advantages of the plan. Every room in every flat can have large windows looking out on an open space; every occupant can have plenty of fresh air and light. Each flat, moreover, possesses a small terrace of its own which can be used by children for their play or can be turned into a miniature garden. Where several of these buildings are built close to one another, none of them will take the light from the windows or terraces of any other, and the streets will not be darkened as they are by perpendicular houses. In a detailed communication Mr. Gjerlov-Knudsen has shown how he would adapt his building to the needs of a sanatorium, convalescent home, or seaside hotel, and it seems particularly fitted for such purposes.

The amenities are obvious; but it is equally clear that construction would be expensive. First of all, the site would have to be bigger than that of the ordinary block

FIG. 2.



The same in cross-section.

building, because so much space is "wasted" by the cruciform plan. Owing to the limited accommodation in the upper storeys there would be a smaller number of tenants to pay rent than might be expected in a building covering so much ground. The vast area of the outside walls would be very far from economical, and there is the added objection that the *inside* walls in the lower storeys would have to be strongly constructed so as to bear the weight of the distal outside walls of the flats above them. At the present time it is largely lack of money that prevents the construction of more and better houses, and architects already do what they can to bring light and air into their buildings. But where money can be spared, or where a wealthy client can be induced to sacrifice external decoration to the health of those who have to live in his building, there is certainly scope for the application of the Danish plan in its essentials. Light and air are worth great sacrifices. In the meantime it will be reserved for some nation looking at other than pecuniary results to build the first complete town of terrace buildings, for which Mr. Gjerlov-Knudsen has already devised an alarmingly symmetrical plan. Further particulars can be had from him at Dosseringen, 36, Copenhagen.

## A BOOK ABOUT SUGAR.

AN interesting little book[1] by Mr. Geoffrey Fairrie, designed to present general information about sugar in such a form that it can be easily understood by the man-in-the-street, has reached us. The volume is not, however, solely for popular consumption, since it contains a considerable amount of up-to-date technical detail which should be of considerable value to the serious student. Although the author is a director of the largest privately-owned sugar refinery in the world, the point of view presented is not exclusively that of the refiner; he deals impartially with every aspect of the subject, without so much as hinting as to whether the establishment of the beet sugar industry in this country is likely to affect the refining industry adversely or not. The book opens with a brief chapter on "How the plant makes sugar"; then follow two chapters on the outlines of the production of raw cane and beet sugars respectively. In the fourth chapter the production of unrefined direct consumption sugars are described, and the two following chapters are devoted to modern refining processes; the second of these chapters contains a valuable section on charcoal and decolourising carbons, in which will be found a considerable amount of first-hand information which is not otherwise so easily accessible. The seventh chapter is historical, being devoted to old-time methods and their development; chapter eight contains a brief and popular account of the physiological aspects of carbohydrate metabolism, and in the ninth chapter are described a number of other sweetening agents, such as maple sugar, glucose, lævulose, syrups, and molasses.

Although the number of works dealing with the manufacture of sugar is considerable, we know of no book which gives such a comprehensive account of the whole subject of sugar, and we can recommend it as a readable book containing reliable information.

[1] Sugar. By Geoffrey Fairrie. Liverpool: Fairrie and Co., Ltd. 1925. Pp. 233.